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Powerful Electric Locomotives for British Railways

SPECULATION as to the type of locomotive to be used on the 50-cycle electrified lines of British Railways in the future has been ended by the contracts with several major British electrical firms announced by the British Transport Commission. The orders, given in detail in our Contracts and Tenders section, are for 60 complete main-line mixed-traffic locomotives and for 40 equipments for locomotives to be built in British Railways workshops. This is the third series of major contracts to be placed this winter in connection with 50-cycle electrification, the first, for overhead line equipment for the Manchester-Crewe and Colchester-Clacton sections, having been placed last October and the second, for train equipments and switchgear, in January. It is to be hoped that a large proportion of the other orders for the main-line electric locomotives to be built as part of the electrification programme will also be placed with private industry. With their ability to work both passenger and freight trains, and the 3,300 h.p. available—making them the most powerful electric locomotives in Britain—these should be capable of dealing with any trains at present envisaged in this country. The indications are that, allowing for modifications in the light of experience, they will be the first of standard types. Those of type "A" will be able to reach speeds up to 100 m.p.h. and type "B" speeds up to 80 m.p.h. The difference between the types is substantially one of gearing and they will be similar in most other particulars. Among features of special interest is the use of fully-suspended motors, mounted on the bogie frames, with fully-flexible drive to the wheels, instead of the usual axle-hung motors. They also follow a trend now noticeable in many parts of the world in having a Bo-Bo wheel arrangement, giving a 20-ton axleload. The d.c. traction motors will be fed from transformers and rectifiers on the locomotives, with the possibility of germanium-type rectifiers being used on some of the locomotives supplied by British Thomson-Houston. Full power will be available on both the 25,000-V. open sections and those at the 6,600 V. to be used where there are clearance difficulties which make the higher voltage impracticable. The switching for either line voltage will be carried out automatically. The external appearance of the locomotives does not seem to have been decided at present, but standard pantographs will be used for all makes and the layout of the driving cabs, one at each end, will be the same in all cases.

The Late Colonel K. R. N. Speir

COLONEL K. R. N. SPEIR was 80, and, though recently in apparent good health and spirits, had not long since undergone a serious illness from which it was not expected that he would recover. Nevertheless, the news of his death comes as a shock and brings a feeling of loss to the many who disregarded his blunt exterior and recognised only the reality and breadth of his character. A fearless man with decided views often against those of the majority seldom finds general popularity, and Colonel Speir did not disprove this rule. But even those whom his sometimes forbidding manner intimidated could not doubt his integrity and must often have suspected the underlying humanity. The direct approach must be directly met—evidence of its success in one instance can be seen on a silver salver presented to Colonel Speir in 1946 by the Officers of the Canadian Movement Control. The inscription ends with the words: "In appreciation of his many kindnesses"—an unusual phrase in such a usage. Perhaps there is none better to express the feelings of the many at home and abroad who met and came to know him through his tireless work for the Transportation Club, in the cause of which he worked so selflessly from its inauguration until his retirement in March, 1954.

A Warning from Malaya

AT the ceremony of handing over the first main-line diesel-electric locomotive for the Malayan Railway at the Preston Works of the builders, the English Electric Co. Ltd., last week, Mr. C. G. Harrison, General Manager of the railway, took the opportunity to give a warning to the British locomotive manufacturing industry. As to the dispute in the engineering industry, he pointed out, he was concerned, not with who was right, but with the effect on exports from Britain. The order for the locomotives, the first of which he was accepting, had been open to world tender, and it had been placed with the builders solely on the merits of the tender. He was naturally pleased to see the order placed with a British firm, and, he added, there was still not a little goodwill towards Britain in South Asia; but he emphasised that there would be no hesitation by the Malayan Railway management in placing further orders in other countries if the price and delivery dates quoted there were more favourable. This is a stern warning; it is to be hoped that all concerned will take it to heart, and especially those who have been responsible for the recent unjustifiable strike, with the most serious effects on the British engineering industry.

Rehabilitation of the Argentine Railways

HOPES that railway equipment to the value of some £5,000,000 may be purchased in Britain by the Argentine Railway Commission now in London cannot

fail to suffer a setback with a report—not yet confirmed—from Buenos Ayres that a group of Netherlands manufacturers of railway equipment has offered to take over the entire programme of railway rehabilitation in Argentina. The group, it appears, would supply all necessary materials and equipment and also send out experienced staff to plan the operational aspects of the railways. The money needed for the programme, to be spread over 10 years, would be raised in the Netherlands on suitable terms. If the report is confirmed, it marks an exceptionally bold venture on the part of the Dutch, for the sums involved are very large. The 155,000 tons of rails and accessories needed will cost some U.S.$20,000,000 and imported diesel motive power will take a further $100,000,000. Some 280 miles of track in the Buenos Ayres suburban area are to be electrified and a great deal of equipment will be needed for this. The total cost of the rehabilitation programme has been put at £1,000,000,000, of which half will be spent on imported equipment.

Nigerian Railway Development

THE sound economic condition of the Nigerian Railway Corporation, on which Mr. Abubaka Tafawa Balewa, Minister of Transport, commented in the House of Representatives in Lagos recently, is shown by the gross surplus of £2,800,000 expected at the end of the 1956-57 financial year. This has been achieved without increases in charges. The poor groundnut season, however, makes it unlikely that such a large surplus will be repeated next year. In 1956, 40,000 more tons of freight and 883,000 more passengers were carried than in the previous year, but the additional wagons and coaches already delivered or on order should enable the railways to deal with increased traffic. The route of the proposed 400-mile extension in the north-east to Maiduguri, in connection with which two traffic surveys have been carried out, has been flown for an aerial survey and is being mapped. This scheme will take another step towards realisation when representatives of the World Bank visit Nigeria later this year to discuss the finance of the project. The line would provide an outlet for the produce of the fertile Bornu plains and open up a Province which now is without good means of communication.

Modernisation in the North-East

PLANS for railway improvements in the North Eastern Region in 1957-58, some of the major items of which are described elsewhere in this issue, show that this heavily-industrialised area is to have a railway service worthy of its importance. The multiple-unit diesel services which have proved so successful are to be extended to the Leeds-York-Scarborough line, and the Middlesbrough-Newcastle and Newcastle-Carlisle services should be entirely diesel-worked by the end of next year. A step to increase the use of 24½-ton mineral wagons will be the strengthening of the West Blyth staiths, which deal with a million tons of coal a year. Other freight traffic improvements will spring from the modernisation of freight terminals and concentration of sundries traffic at selected depots. At Leeds, the City station is to be remodelled to take the traffic now dealt with at the Central station and a new line between Beeston and Churwell is under consideration to allow trains from Kings Cross and Doncaster to run direct into Leeds City. Another track extension of importance is the up slow line to be built between Pilmoor and Alne, which will complete the quadrupling of the main line between York and Northallerton. With associated signalling improvements north of Pilmoor, this will enable freight trains to be diverted from the more difficult Leeds-Harrogate-Northallerton line.

B.T.C. Officers' Conference at Oxford

A USEFUL occasion for discussing common commercial problems and exchanging ideas was afforded by the British Transport Commission Officers' Conference, held earlier this week at Balliol College, Oxford, with transport commercial policy as its main theme. The conference was the third of its kind to be held since the establishment of the Commission; previous conferences were held at Felixstowe in 1949 and 1950. It was attended by members of the Commission and of its Area Boards and Divisional Boards of Management, and by over 130 officers, from assistant district officers upwards, representative of all the Commission's principal transport and catering activities. Sir Brian Robertson, Chairman of the Commission, presided over the conference proceedings, which consisted of two principal papers, with syndicate and plenary discussions of both: "The Pattern of Future Traffic," by Mr. David Blee, General Manager, London Midland Region, and "Selling Transport," by Major-General G. N. Russell, Chairman, British Road Services Board of Management. A representative selection of recent British Transport films also was shown. Apart from the formal proceedings, the gathering was a valuable opportunity for developing contact between officers of the several nationalised transport undertakings.

A New B.T.C. Publication

THE first issue has reached us of *Transport Age*, a British Transport Commission quarterly publication which sets out to form a link between the nationalised transport undertakings and the industries they serve, and tell them about the variety and scope of the transport services which are available. The new journal, which is being distributed to all the principal trading and manufacturing customers of British Transport, is primarily concerned with freight services and all the branches of inland transport are dealt with. Inevitably, however, it must reflect the continuing predominance of British Railways in the national transport system. An article in the first issue shows how rail transit times will be cut by the mechanisation of marshalling yards. The 36-page issue, which is attractively produced, also features industrial Tyneside in the first of a series of articles dealing with important industrial areas of the country; other articles describe methods of bulk transport and the duties of District Commercial Managers.

The Midland Renaissance

THE London Midland Region is to be congratulated on the complete re-casting of the Midland Division main-line passenger timetable, to take effect from June 17 next, which will restore almost in full the speed and frequency of the prewar Midland train services. Leicester once again will have six 99-min. trains daily over the 99·1 miles to and from St. Pancras; and with five non-stop expresses to and from London daily, several at all but 60 m.p.h., Nottingham and Sheffield also will be far better served. An interesting feature of these improvements is the restoration of a really fast service in each direction, at even intervals, between St. Pancras, Leicester, Derby, and Manchester, which should help to relieve the Western Division route via Crewe or Stoke, especially while electrification work is in progress between Crewe and Manchester.

New Anglo-Scottish Expresses

AN outstanding feature of the summer passenger services is the additional fast day services to be provided over both the West and East Coast Routes between London and Scotland. For the first time there is to be a departure from Glasgow for London, of the new "Caledonian," early enough in the morning to allow the businessman to keep a London appointment—albeit rather late, with arrival at Euston at 3.10—in the afternoon, and, in the opposite direction late enough to give the large part of a day in London before leaving at 4.15 p.m. Another improvement is to start the southbound "Midday Scot" from Glasgow at 3 p.m. instead of 1.30 p.m., with a non-stop run from Carlisle and a Euston arrival at 10.20 p.m. On the East Coast Route the addition of the 6¾-hr. "Morning Talisman" to the existing "Afternoon

Talisman" service will, like the West Coast "Talisman," enable the same two sets of stock to make the double Anglo-Scottish journey daily, with departures from Kings Cross at 7.45 a.m. and 4 p.m., and from Edinburgh at 7.30 a.m. and 4 p.m. Other welcome improvements are the reintroduction at long last of 2-hr. runs between Waterloo and Bournemouth Central and the accelerated interval service to Hastings by the new diesel-electric trains.

Standard Gauge from Sydney to Melbourne

NEWS that plans have been agreed between the Governments of New South Wales and Victoria for a 4-ft. 8½-in. gauge line from the State boundary to Melbourne is a reminder that the Australian gauge question is still active. It appears that the scheme would cost £10,000,000, and that the two State Governments are asking the Commonwealth to finance the project. The proposal is stated to be for conversion to standard gauge of one of the existing two 5-ft. 3-in. gauge Victorian Railways tracks between Melbourne and Mangalore, and for the laying of a standard-gauge track alongside the present broad-gauge single track between Mangalore and Wodonga, where connection is made with the New South Wales Government Railways. Some 190 route-miles of new line are involved, apart from yards. The cost, it is claimed, would be recovered in economies from abolition of transhipment and in increased traffics resulting from the improved service which would be made possible.

New Signalling at Metz

THE simplification of the lines being effected by the French National Railways at and near Metz main station in connection with the extension of the 50-cycle system of electrification has been accompanied by the opening of a central signalbox with relay interlocking and standard colour-light signal aspects. Power signalling has been in use there from 1908, when the lines were under German management, and four all-electric boxes, one of which was a controlling box, equipped with Siemens frames and block apparatus, were brought into service. They were of the type used, after some initial experimental installations of the 1890s, up to 1912, and had constant current detection and separate route and signal levers, as seen in mechanical installations in Germany. Probably the largest box of this design was the one opened about the same time as those at Metz at the Nord station in Brussels, which remained in use for many years. The principles embodied in these frames found much favour in several countries and continued to be followed, with good results, until the arrival of relay interlocking and altered views on traffic working brought a change into the picture.

Locomotive Efficiency and Availability

MANY years will elapse before steam locomotives are entirely eliminated from the world's railways, despite increasing developments in other forms of transport; there are still some 18,000 steam locomotives on British Railways. It therefore follows that it would be a shortsighted policy for railway engineers to write-off the steam locomotive as a prime mover. Various equipment, such as roller bearings, and cam-operated valve gear, has been increasingly adopted with the object of increasing the efficiency and availability of the steam locomotive, but the component which undoubtedly has the greatest influence on these aspects is the boiler, and its condition during service. Elsewhere in this issue is a description of the T.I.A. feed water treatment applied by the French National Railways to all their steam locomotives. The results obtained indicate that the expenditure incurred has been amply repaid in efficiency, and saving in capital expenditure. The decision to apply the treatment to all S.N.C.F. locomotives was decided only after much experimental work and conducting of actual trials. An important factor in feed water treatment is the method of control, which should be such as to eliminate, as far as is practicable, the human element.

Tax Threat to Dieselisation

WITH the Chancellor of the Exchequer due to open his Budget next week there is ominous talk in the lobbies at Westminster concerning the duty on oil. Demand for the removal of the extra shilling tax, imposed during the Suez crisis to compensate for loss of revenue due to reduced consumption under rationing, is accompanied in some quarters by the suggestion that the time for a revision of the duty and its imposition on a new basis has arrived. A substantial reduction in the duty, but with its imposition on all oil consumed irrespective as to use, is one suggestion being freely discussed. The argument advanced is that the present high level is prejudicial to road transport and favours the railways which with increasing adoption of diesel traction will become larger consumers, and that industry in general, which is also consuming the heavier oils in increasingly large quantities for power and heating, could afford to share the oil tax burden. To spread the tax over the whole field of users of oil would enable it to be halved from the rate of 2s. 6d. a gallon obtaining before the Suez Canal was closed. This figure was given by the then Financial Secretary to the Treasury, Mr. Henry Brooke, in reply to a Parliamentary Question at the end of last year; he stated that if the estimated yield of the hydrocarbon oil duties for the financial year now ended at the rate of 2s. 6d. for imported and 1s. 3d. for indigenous oils, totally £340 millions, were spread over the total quantity of hydrocarbon oil delivered for use in this country at the level current before restriction in supplies, it would amount to about 1s. 3d. a gallon. It is significant that the Member who put this question, Mr. Frank McLeavy, is the chief spokesman of the Transport & General Workers' Union in the House of Commons and the champion of road as against rail transport.

Another plausible argument used is that the pattern of consumption as between the different oils has become distorted and changes in the incidence of tax might help to correct it. Petrol rationing and oil restrictions revealed that there is a surplus of petrol and a shortage of the heavier oils including the gas/diesel oils, known as the middle distillates. As modern refinery technique is believed to have reached the point where the maximum of the diesel oils and the minimum of petrol is being produced, any increase in consumption of the former proportionately greater than in petrol consumption will distort the picture further. This tendency has been most marked since the war and the figures of proportions of the different products consumed in Europe have shown a definite increase proportionately greater in the middle distillates and fuel oils than in petrol. For 1938 the percentages of consumption were 49 for petrol to 17 for the middle distillates, but by 1955 petrol took only 28 per cent and the diesel oil ranges 27 per cent and heavy fuel oils the balance. Although final figures are not available for 1956 it is estimated that whereas petrol consumption rose that year by 6 per cent, diesel increased by 11 per cent and fuel oil consumption by 15 per cent. The trend thus continues and the split between the different products has now passed that point that can be met by the refineries. This means that the deficiency in diesel supplies has to be met by imports which cost dollars.

The oil companies would have this trend halted or reversed and advance the argument that the high level of taxation makes it economic for road transport to switch from petrol to diesel engine vehicles, the latter consuming less and, therefore, the higher the tax the greater the saving. While they favour a substantial reduction in the oil duties, if that is not forthcoming differential taxation as between the light and heavy oils or the spreading of the burden as mentioned above over all oil consumed would be preferred to its present inequitable incidence.

It is true that transport use is taxed only on the roads, railways and ships being free. The taxed section of transport uses only a little more than one-quarter of total oil consumed; and as diesel engine vehicles take only one-third of this, the contention that a change in taxation

would slow down or halt the switch to diesel and thereby change the pattern of consumption is not convincing. The impact on total consumption as between petrol and derv would hardly be significant enough to do so. Be that as maybe, the imposition of a tax on diesel oil used by railways and shipping at this time would be most undesirable. At long last British Railways have embarked upon a major programme of dieselisation which is already bringing most encouraging results in increased traffics where diesel traction has been introduced. Starved too long of capital investment, they have lagged behind the railway systems elsewhere and have consequently suffered greatly from loss of traffics to the roads. If the cost of their increasing diesel oil consumption was artificially raised by taxation the monetary gain from conversion from steam to diesel motive power would diminish or disappear. It would be illogical if not crazy economics if the State, which is now committed to advancing funds to the railways to meet their large deficits, were unnecessarily to increase its liability by gratuitously adding to those deficits in this way. It would be a case of having to dole out more to get back less.

The railways are in a difficult enough position financially, and Government policy should be directed to enabling them to fulfil the plan outlined in last year's White Paper, though with the latest wage increases that becomes highly problematical if not impossible. Further, their rate contribution is now to be substantially raised. But this makes it all the more essential that nothing be done in next week's Budget to impose fresh burdens upon the railways. If the present basis of oil taxation is harmful to road transport and distorts the pattern of oil consumption, then some other way of righting it must be found. It is no grounds for extending its harmful effect to the railways.

Railway Officers' Salaries

WITH the acceptance of the British Transport Commission offer of a 5 per cent increase by the Transport Salaried Staffs' Association last week, with its attached conditions relating to co-operation and productivity, the bulk of railwaymen have now secured an improvement in rates of pay, the National Union of Railwaymen having been a party to the original agreement reached on March 22. Only the Associated Society of Locomotive Engineers & Firemen has refused to come into line, its leaders adopting the attitude that the increased pay can be accepted, but not the conditions. It must be assumed that they are concerned about the question of manning diesel and electric locomotives, but the agreement to which they have been asked to subscribe would commit them only to agreeing to discussions, so that it is hard to see what the Society has to lose. Its attitude is being interpreted as a refusal to link higher pay with higher productivity—which does it no credit and suggests that it is ignoring economic facts. No doubt the A.S.L.E.F. is willing to discuss productivity if it is not linked directly with wages in the talks, but this is begging the question, for the two factors are firmly related in the economic structure of the country. It is to be hoped that the union will realise this and subscribe to the general agreement. Inter-union rivalries, if these are partly the reason for the A.S.L.E.F. attitude, are foolish and out-of-place in the present economic condition of British Railways. Unions and management alike must work towards modernisation and efficiency in the industry if it is to prosper and be able to pay higher wages to all.

Much of the burden of planning and supervising the economic revival of the railways, apart from the exacting duties of day-to-day management and supervision, falls on railway officers, who tend to be forgotten when salary increases are considered and to receive some recognition only long after that accorded to the men they lead. Sir Brian Robertson, Chairman of the Commission, has stated recently that he does not "grudge the money to the men." It would be a gesture calculated to make railway officers even more keen on their part in railway plans and to foster goodwill if this same attitude could be extended to them. Unfortunately, there seems to be an impression that rises in the cost of living affect only the lower-paid railwaymen. This may be true as far as certain basic necessities are concerned, but the railway officer has heavy responsibilities for which he expects, rightly, to receive a commensurately high salary which will enable him to live on a higher scale. Everything he and his family buy has increased in price, education for his children has become more expensive, and his standard of living has become progressively more difficult to maintain. Even although senior officers' salaries are limited by the amounts paid to Members of the Commission—which in themselves compare unfavourably with the salaries of men with comparable responsibilities in other walks of life—there is no reason why "ceilings" determined by the Civil Service standards which obtained at the time of nationalisation in 1947 should be allowed to set the scale of remuneration of executives of what is, by statute, bound to function as a great commercial undertaking—the largest, we believe, in the world.

The practice of the Commission in recent years seems to have been to grant, after negotiation with the British Transport Officers' Guild and the Transport Salaried Staffs' Association, to officers in receipt of lower rates of pay, increases approximating to those granted to classified salaried staff. This increase has fallen off in proportion as the salary concerned has become higher. Thus, in November, 1952, when salaried staff had an increase of 7s. a week, officers received £18 a year up to £850, £15 between £851 and £1,095, and nothing at all where salaries exceeded £1,095. In February, 1954, clerical staff had an increase of 6 per cent and officers received varying amounts from £45 at £780 to £65 at £1,650 and over. In January, 1956, clerical staff received a 7 per cent increase, but officers, after hard bargaining, secured advances ranging from 7 per cent at the bottom of the scale to 5·6 per cent at £1,500. On the one occasion when officers' salaries were taken to arbitration, Mr. W. P. Allen, Manpower Adviser to the Commission, made it clear that the Commission regarded a tapering of salary scales as unavoidable and indicated that as every increase in the cost of living had to be absorbed, those best able must expect to "consume the greater part."

This view of officers' salaries might possibly stand up to argument rather better if railway officers' remuneration corresponded to that of executives in industry bearing similar responsibilities. Despite the improved social conditions which have practically nullified the peculiar advantages of railway service, such as security of tenure, there is still a school of thought which puts the railway officer in a class by himself and believes that his compensating advantages should make him willing to accept a lower salary than his colleague in industry. This convenient way of thinking is largely responsible for the fact that the railway officer is almost invariably less well paid than those with whom he has to associate in his course of business. His expenses also tend to be scrutinised over-carefully and interpreted in a far from generous spirit. This is not the way to get men of ability to give of their best and certainly not the best way to encourage young and able men to remain in the railway service. It may be that, as far as younger men are concerned, there has been some recognition of this fact, for there seems to be a tendency to give younger men greater reward by promoting them more quickly. If they are really the best men for the posts there can be no objection to this, but if it is a way of giving them higher pay to keep them in the service or merely to conform with a practice now fashionable in some sections of industry, without raising salaries in general, it is a thoroughly bad thing. Once a "too old at 45" feeling permeates the railways there will be no incentive for older officers to remain keenly interested in their work, and, after a few years, the younger men will realise what is happening and will not be deceived. In a country with an ageing population such a move, in any case, would be against the natural order of events.

The re-organisations in the Eastern and North Eastern

Regions, and the appointment of Traffic Managers, raise the question of whether the number of traffic officers is to be increased or reduced. This will not be apparent until more details are available, but in any case it is to be hoped that the Traffic Managers will be rewarded in accordance with their responsibilities, which seem likely to be great. If the number of officers under them is to be reduced there is all the more reason for paying them well, but fewer posts mean fewer openings for potential officers. Young men of ability will look carefully at these points before joining the railway service. Egalitarianism does not produce leaders. The railways must be prepared to reward hard work and capability if the officers of the future are to be attracted and those already in the service be encouraged to greater efforts. Those who plan productivity are no less deserving of reward than the men who carry out the work on the ground.

New Zealand Government Railways in 1955-56

FROM the annual report of the New Zealand Railways Commission for the year ended March 31, 1956, a copy of which we have received from the Chairman, Mr. W. E. Hodges, it is clear that this was a year of record service. Primarily this satisfactory result was due to increased and more modern equipment and to the greater effort and efficiency of the staff. The Minister of Railways, Mr. J. K. McAlpine, in his statement introducing the report to Parliament expresses the view that "the result was nevertheless very pleasing, for a substantial increase in expenditure was absorbed without any increases in rail rates or fares."

The increase in expenditure was due mainly to the full impact of the general wage increase that only affected the previous year in part. Other contributions to the increase were the cost of moving heavier traffic, increased cost of materials, and larger contributions to depreciation and renewals funds. In the circumstances, the figure for net revenue was considered to be "a satisfactory reflection on the year's operations." It is noteworthy that capital invested in the railways and subsidiary services was £108,548,184, and that capital expenditure during the year was £6,386,262, of which £2,790,958 was for rolling stock.

Some of the principal railway results were:—

	1954–55	1955–56
	Millions	
Passenger journeys	24·74	25·08
Goods tonnage	9·69	10·04
Total train-miles (revenue)	14·42	14·88
	£ millions	
Coaching traffic earnings	3·31	3·29
Goods ,, ,,	23·23	24·07
Total operating revenue	27·01	27·87
Net operating results	1·47	1·10

Outstanding developments during the year included progress made in the changeover to diesel-electric traction and the introduction of the long-awaited railcar services. Thirty 1,425-h.p. diesel-electric locomotives ordered from North America were in traffic within 11 months of the order being placed. These engines have proved to be reliable in operation and have eliminated traffic congestion on the main trunk line, improved wagon turnround, and reduced train-hours. Of the 42 750-h.p. diesel-electric locomotives ordered from Great Britain, built by the English Electric Co. Ltd., with mechanical parts by the Vulcan Foundry Limited and Robert Stephenson & Hawthorns Limited, 12 were delivered during the year and are proving useful on secondary lines. Twenty-two diesel shunting engines were also placed in service. Outstanding on current orders at March 31, 1956, were four "Ja" class steam locomotives to be built at the Hillside Workshops, Dunedin, and 17 more diesel shunters as well as the remaining 30 750-h.p. diesel locomotives.

By that date also, 19 of the 35 new twin-set railcars were in traffic, 18 having been delivered during the year. Their introduction enabled some steam services to be taken off, and greatly improved passenger services on the Wellington-Gisborne, Picton-Invercargill and Christchurch-Greymouth sections.

The most notable events during the year were, however, the completion of the Hutt Valley electrification and the opening in July, 1955, of the adjacent Rimutaka deviation with its 5½-mile tunnel. This electrification completed the Wellington suburban electric system, all the suburban passenger services on the 53 route-miles of line radiating from the capital being electrified; some 14,000,000 passenger journeys are made over these lines annually. On the Rimutaka section passenger traffic had more than doubled and goods traffic had increased by two or three times since the completion of the tunnel.

Resulting from the review by the Commission in 1953 of branch lines being worked at substantial loss, the Government approved, during the year, the closing of five branch line sections and the whole of the 60-mile Nelson section. The report concludes with a commendation of the staff for having handled "the new record volume of traffic . . . at no small personal social sacrifice to enable the needs of the community to be met."

Running and Braking Trials in India

FOR the time being, at all events, the prospects of high speeds with main-line passenger trains in India do not seem likely to improve, though the rapid acceleration possible with electric and diesel traction will doubtless result in reductions in overall times over sections where these forms of motive power are being introduced.

Before the introduction of the new vestibuled air-conditioned express trains between some principal centres, the Government railways instituted a series of trials with the "W.P." class Pacific type locomotive hauling trains of from 380 to 465 tons at speeds of 60-70 m.p.h., presumably on the level. The table below gives some of the running results:—

Load (tons)	Speed (m.p.h.)	Average d.b.h.p.	I.H.P.	Steam (lb./hr.)	Rate of firing (lb./hr.)	
					"B" coal	"A" coal
380	60	575	1,275	19,500	3,650	3,200
380	70	710	1,610	25,500	5,000	4,300
420	60	620	1,320	21,000	4,000	3,500
420	70	800	1,700	26,500	5,300	4,600
465	60	680	1,380	22,000	4,300	3,700
465	70	880	1,780	28,500	5,850	5,000

Braking tests were also carried out with emergency brake applications on the 465-ton train, providing the following information:—

Speed (m.p.h.)	Distance to stop (ft.)	Time to stop (sec.)
70	3,660	58·0
65	3,170	53·2
60	2,640	47·5
55	2,100	41·0

A further series of braking tests was envisaged with direct-admission valves fitted to the vacuum cylinders with a view to reducing the above distances and times. As a result of track inspection in connection with the running trials, it was decided that speeds over 65 m.p.h. were inadvisable.

C.I.E. Diesel Traction Developments

COMPLETION of its programme of turning over to diesel traction is hoped for by Coras Iompair Eireann by the end of this year; the total cost is estimated at £6,000,000. Diesel-electric locomotives already in service include 60 Metrovick 1,200-b.h.p. and nine Sulzer-Birmingham 960-b.h.p., the former complete, and the latter part delivery of the first contract placed in 1954, and five diesel-electric shunting locomotives fitted with 487-b.h.p. Mirrlees TLDT6 six-cylinder four-stroke engines, exhaust gas pressure-charged on the Büchi system, which were built at Inchicore in 1948. There are also 60 diesel-mechanical railcars of A.E.C. type in service. Delivery is now being made of 34 diesel locomotives of 550 h.p. by Metrovick

and five more of 960 h.p. have been ordered. At the Inchicore Works, a start has been made on 19 new diesel-hydraulic locomotives. The first is virtually completed and will be on test shortly. Six more railcars are also nearing completion, and will be in operation within a few weeks.

With the introduction of diesel locomotives and railcars, which are now covering 110,000 miles a week, operating methods are being radically altered to provide for faster and better passenger and freight services. Three Deutz diesel-hydraulic locomotives of 130 h.p. are in service as an experiment to find if small branch lines proposed for closing can be worked economically. The narrow-gauge West Clare line recently changed over completely to diesel traction, after the introduction of three diesel-mechanical locomotives and four railcars.

To maintain and repair the new diesel units, it was necessary to alter the existing facilities. At Inchicore, the main maintenance depot, a workshop previously used as a boiler and tender repair bay has been reconstructed and is now probably the most up-to-date diesel locomotive maintenance shed in Europe. It includes four three-level servicing bays for locomotives, facilities for railcar overhauls, a fuel pump and injector test room, a filter cleaning room, an instruments room, and a lubricating oil recovery and water treatment plant.

To meet the fuel requirements, bulk storage tanks of 250,000 gal. have been provided at both Inchicore and Cork, and a fleet of 20 rail tank wagons built at Inchicore to distribute oil to small storage tanks throughout the system. At Inchicore also, a mechanical pressure-spray washing plant for washing locomotives has been installed. Each locomotive can be washed in about 5 min. It is estimated that the saving in a full year of complete working to diesel traction on fuel alone will amount to £1,000,000.

However, in the near future when the conversion programme is completed, steam locomotives, which numbered more than 400 a few years ago, will not be entirely eliminated. A number will be kept as a stand-by and for periods of peak traffic.

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Design of Passenger Rolling Stock

March 8

SIR,—I refer to the letter from Mr. R. G. R. Calvert in your issue of March 8. The British loading gauge simply is not wide enough to accommodate in comfort four passengers aside in a side-corridor compartment, even second class passengers. As second class fares are two-thirds of first, a second class passenger can only expect two-thirds of the floor area of a first class seat space. To give adequate leg-room this implies four aside; so second class accommodation must be of the centre gangway "open" type, although with wider seats and narrower gangway than the existing British Railways standard stock.

Yours faithfully,

JOHN RODGERS

132, Worrin Road, Shenfield, Essex

Closing Redundant Railways and Canals

March 27

SIR,—It is surprising that the editorial article in your March 22 issue, in referring to the East Grinstead to Lewes line, should contain the phrase "part of which is single line;" apparently implying that because the line is single it cannot be of much value. If all the double lines in this country carried as much traffic as many single lines overseas—often with the added difficulties of severe curvature and gradients—then British Railways financial difficulties would be over. It is time we ceased to look down on the mere single line and even considered economies by singling some of our double lines which would be possible without adverse effect on traffic. The section of single track in question on the Southern Region "Bluebell Line" is a particularly unfortunate target for the remark, as it is complete for a double track in all respects, and had it been decided to use it as an alternative main line either to Brighton or Eastbourne, no more than laying the actual rails for a second line would have been required.

Many people feel that the withdrawal of rail and road services from rural areas may become a serious affair by increasing the cost of living in the country, and, therefore, the products of the countryside. It seems reasonable to oppose the withdrawal of services on these lines, even though the only alternative may be a subsidy direct or from other transport users.

It is frequently alleged against British canals that the frequency of locks is a serious drawback. The Ashby Canal, 4¼ miles of which will be closed by the B.T.C. Bill, is part of a 60-mile level connected to another 15 miles by only two locks. As it serves a coal-producing area its prospects ought to be good. There was in fact some opposition to this closure and at one time the Minister agreed to withdraw it from the Bill. It is understood that colliery subsidence is at the root of the trouble, and it seems a pity that the railways and canals did not profit by recent legislation which made the Coal Board responsible for making good damage to other landowners' property.

Yours faithfully,

R. G. R. CALVERT

45, Woodwaye, Oxhey, Watford

[Had traffic developed to proportions likely to make the line pay its way, the single-track section between Horsted Keynes and Culver Junction, of the East Grinstead to Lewes line, might have been doubled long ago, before modern signalling techniques were evolved which have since increased the capacity of single lines. British Railways, so far from closing branches, recently have been active in taking steps, with no little success in several cases, to revive branch line passenger traffic by introducing railcars as soon as they can be delivered, and by otherwise improving services. The "Bluebell Line" was carefully considered by the Transport Users' Consultative Committee for the South Eastern Area and by the Central Transport Consultative Committee before the decision was made to close it.—ED., *R.G.*]

Locomotives or Multiple-Unit Sets?

March 30

SIR,—Your correspondents, Messrs. John Rodgers and P. Weil, seem to have agreed on one thing—that multiple-unit motor coaches do "serious" damage to the track and to themselves. This, of course, is a commonly held view but I should welcome some proof of it. Perhaps your correspondents can supply it.

When electric trains are introduced, performance and traffic density always increase; what is required is some proof that the trains as such do the damage rather than these factors. I should not like to think that this is just another case of something said often enough coming to be regarded as the truth. And even if it were true of heavy four-motored motor coaches with ponderous axle-hung motors, is it still true of modern coaches with only two much lighter motors, albeit still axle-hung?

Yours faithfully,

T. R. HUME

8, Highlands Avenue, Leatherhead

THE SCRAP HEAP

Not So Cheap Fares

Two men admitted in court that they bought washers for 2s. 8d. a gross, and with them got 4d. tickets and 2d. in change from London Underground ticket machines. One had 171 pennies on him when arrested. Both were jailed for three months.—*From the "Daily Mail."*

Fast Enough on the G.W.R.

The Great Western system . . . has more than 2,000 miles of road stretching far and wide over all the western counties. The "Flying Dutchman" performs the journey between London and Exeter, a distance of 194 miles, in four hours and a quarter, which, when allowance is made for stoppages, will raise the full pace to at least 60 miles an hour, a rate of speed high enough for all conceivable purposes, and which will probably never be exceeded. . . . Near the head of the promontory which stretches farthest west is the renowned Milford Haven, one of the great natural harbours of the world. From it there issue fleets of steamers plying between England (sic) and the Emerald Isle, uniting Waterford and Cork with the trunk line of the great (sic) Western.—*From "The Shaw, Savill & Co.'s Line Illustrated and Descriptive Guide to the Great Railways of England"* (1886-87).

Short-Lived Bridge

The accompanying photograph shows what is believed to be the world's largest single film set, a railway bridge built by Ceylon Army Engineers for the Horizon-British film "The Bridge on the River Kwai." The setting of the bridge, in the film, is on the Burma-Siam railway. The bridge, with a length of 425 ft. and a height of 50 ft., took eight months to build and some 500 workmen and 35 elephants were employed on the work. The cost to Columbia Pictures Corporation of the construction was some £80,000. It appears for 15 seconds at the climax of the film when it is blown up as a six-coach train is crossing. The line which crossed it was continued along the mountains on each side of the bridge and in all a mile of track was laid.

In the earlier days of silent films (and much lower production costs) more than one film depicted the collapse or burning of real wooden bridges. These were usually timber trestles, and presumably advantage was taken of their being at the end of their useful lives.

Impromptu Accolade

A correspondent relates how Sir Alfred Seale Haslam was knighted when he was Mayor of Derby in 1891. The occasion was Queen Victoria's visit to Derby on May 21, to lay the foundation stone of the Derbyshire Royal Infirmary. The ceremony of knighthood took place in the old reading room of the Midland Railway Literary Institute, which in those days adjoined the Shareholders' Room on No. 1 platform at Derby station, before the present Railway Institute was built on Railway Terrace in 1894. The reading room had been transformed into a reception room for the Queen's use, and shortly before she joined the Royal train, after the ceremony at the Infirmary, she asked her equerry for a sword. He was taken aback, being in civilian dress, so he turned to Mr. G. H. Turner, then Assistant General Manager of the Midland Railway, and explained his dilemma.

Mr. Turner rose to the occasion. He held the honorary rank of Lt.-colonel in the Railway Transport Corps and kept his uniform and sword in his private office, for he used to wear his uniform on the annual Midland Staff Ball nights. The sword was quickly retrieved from his office and handed to the Queen, who gave the accolade to Mr. Haslam. Five minutes later the Royal train left Derby for Ballater.

Sir Sam Fay, when General Manager of the Great Central Railway, is believed to have received his knighthood in similar circumstances from King George V at the opening of Immingham Dock in 1912.

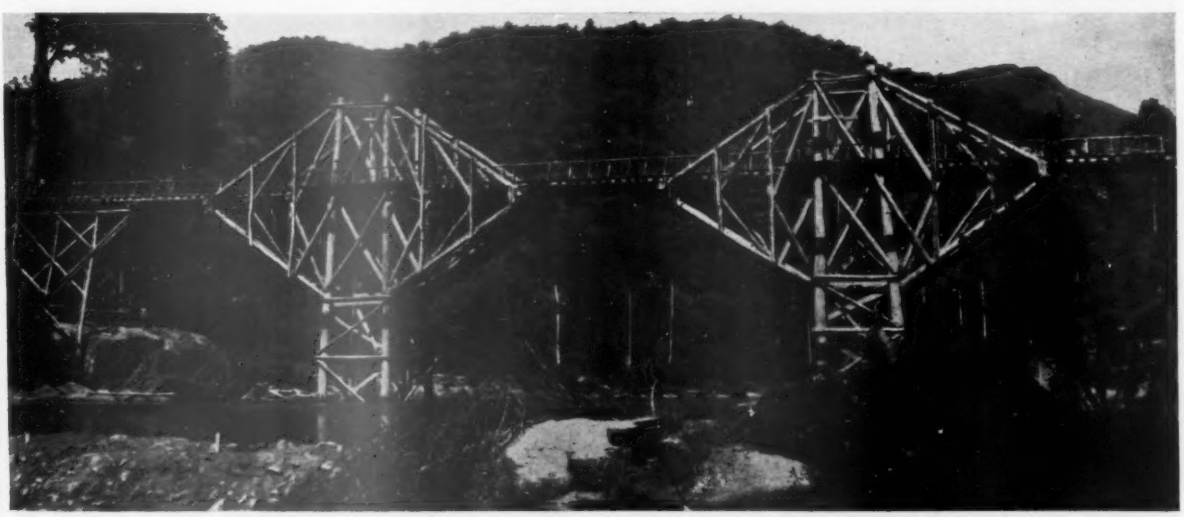
A la Carte

(Complaints about tea menus in British Railways trains)

Getting hot under the collar
At what cost him half a dollar
Made a passenger indignantly complain
Of grave errors of omission
On the part of the Commission
In regard to tea-time menus on the train.
Toast and jam and B. and B.,
Various kinds of cake and tea
All add up, he claims, to sheer monotony;
Delicacies multifarious,
Sweets and savouries, fine and various,
Would be smashing . . . if they'd only got any.

How delightful if the waiter
By some miracle could cater
For the tastes of all who take tea on the run!
As it is, this demonstration
Of the inner man's frustration
Seems to take the cake, the biscuit and the bun.
One man's meat . . . —you know the rest,
Makes it difficult at best
To please everyone—you either like or lump it,
And to waste good cerebration
On such futile remonstration
Tends in time to make one balmy on the crumpet!

A. B.



Railway bridge built in Ceylon for use in a film, at the climax of which it is destroyed

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

RHODESIA

New Railway Mission

The South African Church Railway Mission has been disbanded and a new Rhodesia & Nyasaland Railway Mission formed from April 1, because of the growing difficulty in staffing the mission in an area extending from the Cape to the Congo. The number of railway workers living alongside the line in the Union is decreasing, but more immigrants are pouring into the Federation of Rhodesia & Nyasaland.

INDIA

Central Railway Freight Operation

Two new records have been established in the operating performance of the Central Railway for November, 1956. The wagon-miles per wagon-day on the broad gauge reached 65·3. The net ton-miles per wagon-day rose to 875, the highest ever achieved on the Central Railway.

Dental Service for Railwaymen

A fully-equipped dental clinic is to be attached to the headquarters hospital of each of the seven railways and also the Chittaranjan Locomotive Works. The clinic will be in charge of a full-time dental surgeon. At district railway hospitals, also the minimum dental equipment necessary will be provided and the services of outside dentists will be secured. Treatment will be available to railway employees and their families. No charges will be levied for normal cases of dental consultation, such as extraction, scaling, and cleaning; but for other cases a schedule of charges would be prepared by each railway, and the recoveries made from the staff will be credited to the Staff Benefit Fund.

New Name for Willingdon Bridge

The Willingdon Bridge, on the Eastern Railway over the Hooghly near Bally (Calcutta), is now known as Vivekananda Bridge. Trains connecting Howrah and Sealdah stations pass over this bridge and also pass Bally Ghat station, near the place where Swami Vivekananda lived.

VICTORIA

Demand for Insulated Containers

Growing demand for insulated containers for the interstate transport of semi-perishable commodities, such as margarine, confectionery, cheese products and shoe polish, indicates the popularity of this medium of modern freight handling, particularly during the summer months. Consignors are making more inquiries for rail transport of commodities, especially perishables by container, because of the reliability and speed of fast goods trains operating between Melbourne, Sydney, and Brisbane.

Car Washing Improved

The flail machine used at Jolimont for washing old suburban cars is to be duplicated, and the mechanism is to be elaborated to give transverse movement to accommodate varying car widths. Improved mechanical sprays for prewetting, deterent, and alkaline application will also be installed. At present the machine cleans one side only, the rubbing action on the other side is done by hand.

When extensions now in hand are completed, the flail equipment will wash daily eight trains of seven cars. It is expected that the work will be completed this year. Plans are also in hand for the installation of rotary vertical brushes to clean the new streamline Harris electric trains.

MALAYA

Prefabricated Warehouse

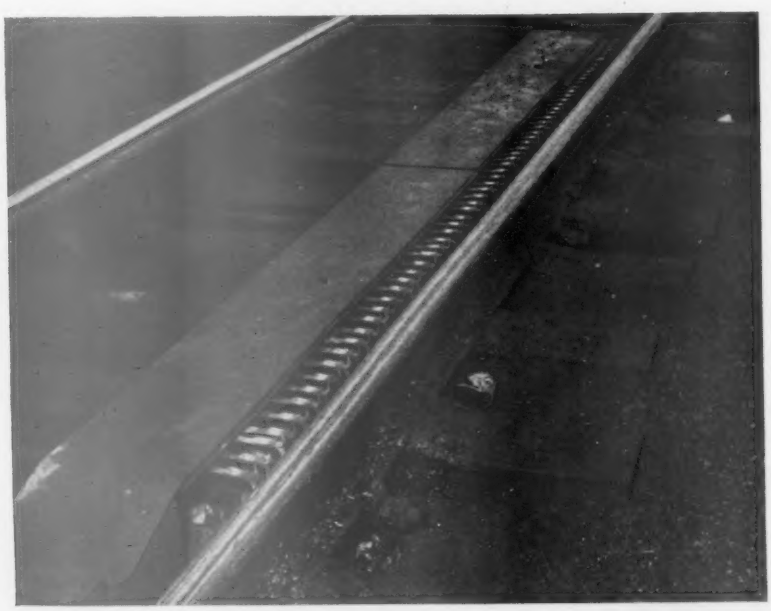
Final shipment was due in Malaya during March of a 900-ft. × 50-ft. railway warehouse for Malayan Railway extensions at Port Swettenham. The building, provided by Taylor Woodrow (Building Exports) Limited, of London, marketing members of the Arcon Group, is being set between the railway lines and a road, and will have eaves extensions on both sides; 8½ ft. on the railway platform side and over 4 ft. on the lorry loading side.

UNITED STATES

Broken Wheel Detector in Hump Yard

The Chesapeake & Ohio Railway has installed on the crest of the hump in the marshalling yard at Stevens, Kentucky, apparatus for detecting breaks in the treads or flanges of freight car wheels.

When one of the "fingers" of the detector fails to be depressed properly after the wheel goes over it, because of a break in the tread or flange, the detector activates an alarm system. A bell sounds in the yardmaster's office and a red warning light appears on the communications panel. The hump operator also has a detector warning light on his control panel. Identification of the car with the defective wheel is simplified because the car or rake of cars to be examined is uncoupled just before passage over the detector. When the bell sounds, the yardmaster can look up to see the car leaving the detector and warn the car inspector foreman.



Broken wheel detector on crest of hump in yard at Stevens, Chesapeake & Ohio Railway, showing "fingers" which are depressed by flanges

Transfer Between Chicago Stations

For many years past the Parmelee Transportation Company has had the exclusive contract for transferring through passengers and luggage between the eight terminal stations in Chicago, and has conducted its business on an extensive scale, seeing that apart from a few through sleeping cars there are no through train services between the 21 railways serving the city. In June, 1955, however, these railways gave

notice terminating their agreement with the Parmelee Company, transferring the business to a new company called Railroad Transfer Service Inc. A district court upheld an appeal by Parmelee against this decision, basing its judgment on a revised city ordinance which named Parmelee as the exclusive operator of terminal vehicles in Chicago, but on January 17 the circuit court of appeals reversed the district court's finding. Parmelee has now filed a suit claiming damages of $19,200,000 for loss of business. Under the court order Parmelee may still carry passengers from the terminals to points in the city, but not from one station to another.

SWITZERLAND

Trial of German Electric Train

Recently a three-car electric set of the German Federal Railways type "ET30" has been under trial on the Swiss Federal suburban lines round Zurich. These units are capable of exceptionally rapid acceleration from rest, and the interest of the Swiss Federal Railways in these trials arises from a desire to accelerate the local services throughout the Zurich area, in which the stations are spaced at close intervals. Experiments have been conducted with a Swiss Federal electric motorcoach "RAe 4/8" No. 662, between Zurich and Basle, with a view to speeding up service also; the time for the 55 miles, in part heavily graded, was brought down to 58 min.

ITALY

Milan-Venice Fast Electric Service

On completion of electrification of the Milan-Venice main line, referred to in our January 11 issue, the State Railways introduced from March 1 a new high-speed train, the "Rialto," worked by an electric train set of the ETR 200 type and taking only 2½ hr. for the 166-mile journey, including stops at Verona and Padua. The train leaves Milan in the morning and returns from Venice in the evening, allowing almost 11 hr. in Venice.

DENMARK

Cheap Tickets

The State Railways have lately introduced two new forms for cheap tickets. The first is available for all aged over 65 and entitles the holder to a journey which must be over 30 miles and return within a month for the single fare. It is not available on Saturdays, Sundays, or Mondays, when ordinary traffic is heavy.

The other new ticket is concerned with the Copenhagen area. Within the city area there is a flat fare and a ticket available for one hour. In the suburban area the traffic is to a great degree rush-hour traffic. Of all up suburban traffic during a day over 25 per cent passengers arrive in the city about 8-9 a.m. The new ticket is available from stations in the suburban area to Copenhagen and only between 9 a.m. and 3 p.m. It allows return travel for single fare, corresponding generally to the price of season tickets.

SWEDEN

New Marshalling Yard at Aange

During 1952-55 the marshalling yard at Aange has been enlarged and modernised. The yard, the biggest in northern Sweden, is 300 miles north of Stockholm. About 1,000 wagons are dealt with daily. It is equipped with two retarders of the hydraulic Frölich pattern, with electric heaters to prevent freezing up. During the winter, temperatures of as low as −30° C. are not unusual.

Publications Received

Industry and Press Relations.—A guide to the handling of editorial publicity in national and local newspapers, for industrial management, employers' federations, trade unions, and technical organisations. By Peter Hayle. London: Staples Press Limited, Mandeville Place, W.1. 142 pp. Price 12s. 6d.—There are few books available on the duties of a press officer, and this book meets a badly felt need. The study of relations with the Press, and of the example of "handouts" given in this book—including one from the British Transport Commission—would make the work of many of those responsible for communicating with the Press, much easier and much more satisfying. The nationalised industries, as a whole, are regarded by Mr. Hayle as having less to learn about newspaper methods and needs than industry in general, but, because of their size and complexity, he points out that "the most willing press officer is helpless if he is not kept up to date by those for whom he speaks."

Die Zwölf Besten Züge Europas (*The Twelve Best Trains in Europe*). By Dr. Fritz Stöckl. Published by the author at Traunkai 11, Bad Ischl, Salzburg, Austria. 9¾ in. × 6¾ in. 270 pp. Illustrated with photographs in monochrome and colour, also diagrams. Price 85 Austrian schillings.—This study is, apart from a few minor errors, accurate, besides being most informative and written in clear, straightforward German. The first part is concerned with the author's choice of 12 "best trains" of today, namely the "Blue Gentian" diesel (Munich-Hamburg), the "Elizabethan," the high-speed electric ETR 300 (Rome-Milan), the "Golden Arrow," the "Comet" diesel (Hamburg-Zurich), the "Mistral," the "Night Ferry," the "Rome Express," the "Senator" diesel (Hamburg-Frankfurt), the "Sud Express," the Spanish Talgo train, and the "Blue Train." The second part briefly describes 24 important expresses in various European countries. The third part deals with six famous trains no longer extant, three of them British. The many illustrations, most of them unfamiliar, are well chosen and reproduced.

Funicular Railways.—Additional to its construction of diesel locomotives up to 350 b.h.p., the Italian company Antonio Badoni S.p.A., of Lecco, also constructs coaling grabs, bridgework, and funicular railways; a 12-page multicolour publication just received is devoted to a description of the Vallecetta funicular railway for passenger transport near Bormio.

Efter Hundra Ar.—This 96-page centenary publication of the Swedish State Railways, Stockholm, consists in the main of almost a hundred pages of photographs showing aspects of contemporary Swedish railway activities with suitable captions. There is a short preface by the General Manager, Mr. Erik Upmark. The emphasis is on "human interest" rather than technical achievement, but the backgrounds of the photographs nevertheless present an interesting picture of Swedish Railways at work. The book is well produced and has board covers. No price is stated. The centenary was the subject of an editorial article in our issue of November 30, 1956.

Springs.—The total production of Alco Products Inc. now includes locomotive construction only to the amount of 20/22 per cent, but the well-known spring plant at Latrobe continues at full capacity, making helical, volute and laminated types, as illustrated and described in a new 16-page booklet, which also includes design data and recommendations.

British Standard for Lifting Attachments.—A new standard, B.S. 2837-1957, specifies steel links and strap assemblies for lifting attachments for packing cases. Previously, guidance on the subject was section 8 of Packaging Code B.S. 1133, these recommendations are being deleted. The standard provides for seven classes of links and strap assemblies having a range of safe working loads from 4 cwt. to 5 tons. The standard recommends that the weld in the triangular link should be in one of the straight sloping parts, and not in the radii, or in the lower straight part of the link. It is realised that this is a departure from current practice, and it may be some little time before manufacturers of links are in a position to meet this new requirement. Copies are available from the British Standards Institution, British Standards House, 2, Park Street, London, W.1. Price 5s.

Staff Welfare on Railways

Maintenance of good staff/management relationship

(*By a correspondent*)

A NOTABLE feature of post-war industrial development in Great Britain and other countries has been the increasing importance attached to staff welfare and the provision of proper amenities. This is, no doubt, due in considerable measure to the so-called state of full employment in many countries, and the resulting competition between employers for the services of limited numbers of trained employees.

It has frequently been admitted, certainly in the case of British Railways, that railways have been somewhat slow in following this lead. In this connection, however, there should be realisation of the much greater problems facing railways. In the first place railways have been industrial pioneers in many countries, and their early development occurred at a time when standards were very different to what they are today. Railway installations and operations are much more widely scattered than are those of most industrial undertakings, whilst hours of work are irregular. These factors must give rise to considerable difficulty in the provision of adequate amenities and ideal working conditions. There has, however, been appreciable developments in this field during recent years.

British Railways Organisation

On British Railways there is a Welfare Officer in each of the six Regions, in addition to an Industrial Relations & Welfare Officer on the general staff at the headquarters of the British Transport Commission. British Railways have declared it to be their policy to provide, as far as practicable, working conditions of a standard and scale in keeping with modern industrial practice.

In general, welfare can be subdivided into two main categories, namely, the conditions in which an employee works when on duty, and the facilities at his disposal to enjoy his off-duty leisure time with profit to his mind and health. The first of the foregoing includes such matters as office space, mess-room facilities, hygienic lavatory accommodation, washing and cloakroom facilities, canteen services, rest rooms for female staff, accident prevention, first-aid and medical facilities. On British Railways there is a close link between the railway management and the trade unions, and the standards set have received the unanimous approval of the unions. A Joint Advisory Council for Welfare, with trade union and management membership, makes recommendations for improved welfare. It is of interest that during 1954 an expenditure of some £1,500,000 was authorised for new welfare schemes covering such items as the provision of improved toilet facilities, cloakrooms, drying rooms, messrooms, huts for permanent way staff, office accommodation, rest rooms and first aid. At that time 83 hostels were in use and these catered principally for train crews.

The provision of adequate medical facilities is generally accepted as a vital part of staff welfare. The functions of the British Railways' medical service are somewhat more restricted than those of many overseas railways. In Great Britain, the National Health Service caters for all the normal medical, surgical and hospital needs of railwaymen, the functions of the railway medical service being to organise efficient first-aid activities and centres; to carry out initial and periodical medical examinations of railway staff in accordance with the requirements of the industry; to undertake research into occupational illnesses and to develop methods of prevention and treatment; to provide an advisory service for the railway management; and to raise the general health standards of staff.

Recreation for British Railways Staff

As regards the off-duty aspect of welfare, this has, perhaps, become of more importance in view of the greater leisure time now available to the average railway employee in comparison with prewar and earlier times. British Railways sponsor a large number of clubs and societies which give employees at the larger railway centres ample scope for sport and social activities. At the beginning of 1952 it was decided to form a British Railways Staff Association to offer railway employees at low cost the possibility of organising social recreational and cultural activities. This association also acts as a co-ordinating body. Also amongst the welfare activities of British Railways is the organisation of inter-regional boxing competitions and other sporting events.

Other general welfare developments on the British Railways are industrial rehabilitation to restore injured and handicapped employees to full physical, mental and social usefulness, whilst special mention should be made of the Welfare Visiting Service of the London Transport, which gives advice and assistance to staff. During 1954, some 12,000 home visits were made and 4,000 London Transport employees consulted the service. The sick pay and pension schemes recently inaugurated by British Railways for the conciliation or wages grades are further recent developments. Similar arrangements have existed for salaried staff over many years.

The Railway Convalescent Homes owned by, and largely maintained by the contributions of, railway employees are also worthy of note. Important voluntary institutions on a similar basis are St. Christopher's (Railway Servants' Orphanage) Derby, the Southern Railway Servants' Orphanage, and the Southern Railway Homes for Old People; both the latter two are at Woking.

The administration of staff welfare on the French National Railways is rather more centralised than on British Railways. There is a Medical & Welfare Officer (Chef de la Division des Services Médicaux et Sociaux) at the Central Headquarters of the S.N.C.F. who is responsible to the Staff Department Manager for all welfare activities; he also maintains liaison with the central operating, rolling stock and permanent way departments regarding the prevention of accidents to staff. In the Regions there is a Staff Assistant on the strength of each departmental chief, day-to-day questions of welfare coming within his jurisdiction.

S.N.C.F. Medical Service

One of the outstanding welfare developments on the S.N.C.F. is its excellent medical service. The functions of this Service are much wider than those of its British counterpart. In addition to carrying out initial and periodical examinations, as on British Railways, the S.N.C.F. Medical Service is also responsible for the free treatment of staff who are ill or injured. In certain circumstances employees can obtain treatment from other doctors, the S.N.C.F. then accepting the responsibility for the fees. There is a Chief Medical Officer for each Region who has at his disposal several hundred full- or part-time doctors, surgeons and specialists; in most cases these assistant medical officers have, in addition, private practices. Before leaving this question of medical facilities, attention should be drawn to the travelling X-ray coaches on the S.N.C.F. by means of which all staff and their families are afforded the opportunity of undergoing periodical examination for diseases of the heart and lungs.

The S.N.C.F. maintains a number of sanatoria, convalescent homes and health centres, one of the most noted being the Cancer Diagnosis and Prevention Centre (Le Centre de dépistage et de prophylaxie des tumeurs) at Paris. The Welfare Service also operates pre-natal and post-natal clinics for employees' families. The Medical Service is responsible for these from the professional point of view.

As in Great Britain, the S.N.C.F. welfare service is responsible for the maintenance of good working conditions. Many of the hostels for train crews lodging away from home are models of comfort, whilst messrooms and canteens are provided on a large scale. The canteens, which are on rail-

way premises, are equipped and maintained by the S.N.C.F., but are expected to cover other expenses, including the cost of food. Particular attention is paid by the S.N.C.F. to the needs of staff at outlying locations, a noteworthy feature being a travelling library van which visits such locations periodically. Each Region provides lending library facilities for both its active and retired staff and their families.

Another important welfare development on the S.N.C.F. is its housing policy. In addition to making loans to staff on behalf of the S.N.C.F., the French Railways Building Society has acquired and constructed houses for railway employees, against repayments. In addition, the S.N.C.F. has constructed, either through the agency of building firms or by direct labour, garden cities for railwaymen.

Division of Responsibility in Holland

On the Netherlands Railways off-duty social welfare is the function of a nominally independent body known as the Foundation for Social Welfare Works. The railway carries out general administrative control and gives financial aid approximately equal in amount to contributions from staff, but the Foundation has its own Board of Control which includes staff representatives. Loans are made for housing and other purposes. It should be emphasised that the railway administration is not concerned in such loans, the only criterion being the social merits of the case. Assistance is given to railwaymen who are in difficulty as the result of family sickness. Children may be sent to convalescent homes or, in the case of mental illness, to institutions; home help may be provided or labour-saving devices supplied where the housewife is incapacitated.

The Netherlands Railways give encouragement to employees' sporting and cultural activities. There are various employee organisations financed mainly by members' contributions, but the railway administration helps both financially and by the provision of premises and grounds at low rentals.

Standards of working conditions, canteens and similar facilities are high, State inspectors being responsible for the maintenance of adequate safety measures. There is a Foundation of Canteens which operates a number of canteens, the railway making rooms and equipment available without charge. The railway administration is represented on the control council of the Foundation. The Netherlands Railways have their own medical service for the entry and periodical examination of employees. There is also a staff association designed particularly to take care of employees and their families suffering from tuberculosis.

Railway Sickness Fund in Germany

In Western Germany the social welfare services of large undertakings are mainly built up on a number of nominally independent schemes which are maintained by employee and staff contributions. Thus the German Federal Railway operates a sickness fund (*Betriebskrankenkasse*) which is not part of a national insurance scheme. Welfare as a whole on the German Federal Railway has undergone considerable reorganisation in post-war years. The first German railway staff association (*Eisenbahnverein*) was founded at Kassel in 1896, its objectives being to give advice to the railway administration and to organise library, social, insurance, saving and loan activities. Other clubs followed but in every case religious, political or trade union activities were excluded. These associations were also instrumental in obtaining canteen and similar facilities.

During the inter-war period the responsibility for staff welfare became more directly assumed by the railway, and the link between the railway and the various associations became closer. During the late 1930s the Reichsbahn took over full control of welfare, and in 1939 the title of the associations was changed to Reichsbahn Fellowship Work (*Reichsbahn-Kameradschaftswerk*); during the war years, largely to offset the possibility of a similar move by the State, the Reichsbahn took over the fellowships, which became a railway organisation for welfare activities. Another change occurred in 1951 when the fellowships became a section within the Bundesbahn with, inter alia, responsibility for health services, convalescent homes, cultural and recreational activities, assistance to sufferers from tuberculosis, and railway canteens. The organisation, with both headquarters and regional staff, has been granted clearly defined legal rights and obligations and maintains its own accounts. Its funds are obtained partly by voluntary contributions from the staff and partly from the railway administration.

A special feature of post-war welfare work has been the emphasis on housing. In conjunction with staff housing associations some 10,000 dwellings were constructed, adapted or reconstructed during 1953, making a total of 153,000 such dwellings occupied by railway staff. Some 42,000 railwaymen, however, were still awaiting accommodation at that time. Considerable improvement has also been made in recent years to hostels for train crews lodging away from home.

Postwar Developments in Norway

The welfare activities of the Norwegian State Railways underwent a radical alteration in the late 1940s. In 1947 a number of Works Committees were set up, these being advisory bodies which prepare suggestions regarding welfare for submission to the railway management. Early in 1949 the Norwegian Government decided that the railways should create a special department for welfare, this plan being brought to fruition on November 1, 1949, by the creation of a Welfare Office.

This office is responsible for the well-being of railway employees both on and off the job and it has, in particular, taken over the supervisory work in connection with the Works Committees. Welfare on the job is organised under two main headings, namely, health protection and employee safety. On May 4, 1948, a Government decree led to the organisation of the State Railways' own medical service.

A campaign has been launched for the protection of railway staff against industrial accidents, until recently there being an average of 2,400 such accidents every year. A so-called Labour Inspection & Protection Service has been organised for this purpose. In connection with off-the-job welfare, the Norwegian State Railways give firm support to staff libraries, sports associations, musical societies, art circles, theatre groups and kindred bodies. Loans are made to railwaymen to help and encourage them to build their own houses, whilst during periods of sickness a system of home helps functions.

General Features in Europe

Referring briefly to other European countries, whilst the degree of attention given to staff welfare varies from railway to railway, no administration can afford to neglect this important subject. In some cases a special welfare department exists, in others the responsibility for such a service rests with the personnel manager. What is common to nearly every European railway—the Danish State Railways appear to be one exception—is an excellent medical service, which, in addition to carrying out examinations of new staff and periodical examinations of other employees, particularly those whose work concerns safety, in some cases offers free medical attention to employees. One of the foremost in this respect is the Italian State Railways, which system also sponsors good libraries, sports facilities, social clubs and educational courses. Periodical X-ray examinations of staff, undertaken by many European railways, by means of mobile and other equipment, have done much to reduce the incidence of tuberculosis.

Special mention should also be made of the loans for housing and similar purposes made by several European railway administrations to staff. At the end of 1951, the Swiss Federal Railways had loans outstanding to 1,924 employees to the total of nearly 36 million francs, whilst in addition 115 employee co-operative building concerns had taken up loans totalling some 31 million francs. Most railways operate some form of sick pay and pension scheme. Considerable help is given by most railway administrations to the organisation of sporting, cultural and social activities. Although the clubs, societies and so on are run, and largely financed, by the staff themselves, most railways give some form of help. In many cases premises and land are provided at a nominal rent, staff are usually granted travelling facilities, whilst, in some cases, the administration makes a pay-

ment towards the expenses incurred. In the sporting field reference should be made to the International Railwaymen's Sporting Union which organises inter-railway sporting events.

Unique Problems in South Africa

The pioneering nature of early railway development in South Africa made necessary the provision of medical facilities, sanitary services and social amenities as the railway penetrated into virtually undeveloped country. Health measures were particularly essential owing to the prevalence of many diseases, especially malaria. These tasks and others, such as safety first, physical education, supervision of home conditions, family education and recreation, became the responsibility of the Health and Welfare Services on their formation during the 1930s.

It has always been necessary to pay particular attention to health matters on the South African Railways, but it was not until 1932 that a Railway Health Organisation as such was inaugurated. In addition to the work normally carried out by a railway medical service, the Health staff carry out much field work, which includes positive health measures to built up resistance to disease, preventive measures such as malaria control, and consultative and inspection duties regarding the working and living conditions of employees.

Positive welfare services commenced on the S.A.R. & H. in 1938. Special mention should be made in this respect of youth clubs, children's clubs and homecraft clubs. Clinics are maintained to give pre-natal and post-natal care to mothers and to look after the needs of children of all ages. Special attention is paid to the welfare needs of non-European staff, and non-European social workers have been recruited to undertake family visiting and group activities amongst people of their own races.

In respect of what might be termed social security, it is noteworthy that the railway pension fund covers every European employee on the permanent and temporary establishment, whilst there are also pension benefits under certain conditions for non-European staff. A contributory medical benefit scheme ensures medical attention and hospital treatment where required for employees and their families, whilst there are also liberal sick pay arrangements. Under a housing scheme introduced in 1937, railway employees are advanced money at a moderate rate of interest for house purchase, no initial deposit being called for from the employee. Large numbers of houses are built for letting by the South African Railways.

Education in East Africa

On the East African Railways & Harbours, the welfare service is under the direction of a Principal Welfare Officer, assisted, at the various centres, by European welfare officers and African welfare assistants. Considerable information was given regarding this service in *The Railway Gazette* of August 5, 1955, and it is not, therefore, proposed to repeat it in this article. Points of particular interest, however, are the emphasis on education for non-European staff and the provision of free housing for all employees.

Medical Facilities in India

In India, the main emphasis with regard to welfare is again on the health aspect. Each of the major railway systems has its own medical officer and, indeed, it is claimed that there is one railway doctor for every 4,000 railwaymen and their dependents. The railways provide a special free medical service for their employees and families. Treatment is normally at railway hospitals which are said to provide three beds for every 900 employees, but facilities also exist for treatment at home or at Government hospitals if necessary. Mobile medical vans serve outlying areas. Railwaymen in India have at their disposal 75 hospitals, 400 dispensaries, 20,000 medical staff of all types, X-ray apparatus, and dental units.

Combating Illiteracy

The railways also provide special facilities for the education of railwaymen's children, either through the direct running of schools or by giving financial and other aid to schools. By means of classes for adults the Indian railways are endeavouring to eradicate illiteracy amongst railway employees.

Other welfare activities in India include the construction of living quarters for essential staff, the provision of canteens and similar amenities, and the organisation of social and sporting clubs. Railway athletic clubs conduct inter-divisional and inter-district sports meetings, the grounds and the equipment being provided free by the railways. There is also an All-India Railway Athletic Association which organises sporting contests on a national basis.

Social welfare activities are organised separately from the medical facilities. There is, on most railways, a Deputy General Manager (Amenities) who is assisted by a number of junior officers and inspectors. Welfare committees, with employee membership, function at every District or Divisional Headquarters. Under the Second Five-Year Plan it is proposed to spend in all some £7,500,000 per year on medical and welfare facilities.

Other Railways in Asia

In Ceylon, Malaya, and Burma, as far as medical facilities are concerned, railway employees are treated as Government servants and receive free treatment. Education is also treated as of great importance in these countries, whilst active encouragement is given to physical development in Ceylon and Malaya through the organisation of athletic and sports meetings. In 1955, the Malayan Railway Staff Welfare Council was inaugurated. This Council is composed of 23 representatives elected by the Railway Recreational Clubs and is under the chairmanship of the Deputy General Manager; its functions cover all aspects of welfare.

Australia and New Zealand

All the Australian and New Zealand railway administrations have their own medical services. Whereas social and industrial welfare is normally under the control of the Staff or Personnel Department, certain of these railways have a medical officer directly responsible for medical matters. Staff are examined at the time of recruitment and periodically in the case of certain grades. To obviate the necessity of bringing all recruits and staff to the railway headquarters for examination, the Victorian Railways recently put into service a medical coach which visits all outlying locations for examination purposes once every four months. Medical coaches are also operated by the various systems to bring medical and dental services within the reach of staff and their families in isolated districts.

The New Zealand Railways run health clinics at large workshop centres. In the more general sphere, mention should be made of the appointment of a Linguist Welfare Officer by the Victorian Railways, and of the construction by the various railways of houses and hostels for immigrants.

North America

In a highly developed country such as the United States, the provision of social and recreational facilities for railway employees is not perhaps so vital as in the lesser developed countries, and the organisation of such activities in North America is left normally to the staff themselves. Needs in this respect in the U.S.A. are, however, largely met by the Railroad Y.M.C.A. which provides social, recreational, physical and educational activities for railway employees and their families. This association is financed by the contributions of over 125,000 railwaymen who are members. The railways are bound by the same industrial health and safety regulations as other employers.

All large railways in the United States and Canada employ at least one full-time medical officer and many have a large-scale medical organisation. This service is, however, limited to meeting industrial needs through the pre-employment and periodical examination of employees, although the railway medical staff is also responsible to some extent for the maintenance of hygenic and sanitary conditions of work. General medical treatment is the responsibility of the employee, but, in this respect, reference should be made to the health and welfare plan negotiated in 1955 between the railways and the employee brotherhoods. Equal contributions are paid by employees and managements, as a result of which railwaymen are entitled to considerable medical and hospital treatment for themselves and their dependants free of charge.

Locomotive Feed Water Treatment

Increased efficiency and availability of steam locomotives on the French National Railways

Treated feed water being delivered from a supply point, showing the position of reservoir on the locomotive

THE fact that there are still some 170,000 steam locomotives in service on the world's railways, is sufficient reason for continued research and development with the object of increasing the overall efficiency and availability of this form of traction. It follows, therefore, that the success achieved by the introduction of the T.I.A. system of feed water treatment on the French National Railways will be of interest to railway administrations; the problems associated with the use of untreated boiler feed water is too well known by locomotive engineers to require recapitulation.

Laboratory Research

In 1939, as a result of a study of the question, Monsieur Louis Armand, now President of the S.N.C.F., developed a water treatment process which, while limiting the concentration of soluble salts in the boiler water to be a convenient level, ensures that the inevitable precipitations take the form of easily removable sludge, and not a hard deposit; the problem of corrosion by absorbing all the oxygen dissolved in the feed water was also investigated.

Initial research by the S.N.C.F. took the form of preparing a detailed hydrological map of the entire system. Then followed a series of laboratory experiments based upon what actually happens during the formation of boiler scale. Incrustations were reproduced by an apparatus simulating actual practice, and using water of a known composition. Precise records were kept of the amount of residue deposited in relation to the quantities of water evaporated. The deposits were systematically analysed and microscopically examined. It was noticed that the boiler scale owed its hardness and strength to a mixture of crystalline needles composed of a variety of calcium carbonate and crystals of calcium sulphate.

It was also observed that it was possible to modify the constitution and chemical nature of the scale by adding well-known agents to the feed water. When correctly regulated, these agents modified the structure of the calcium salts while the water was boiling, causing the crystalline needles to become cubic, and finally rounded, in which state they were non-incrustant in character. These formed a sludge which could be easily extracted at the base of the experimental apparatus. A further point of importance was that reducing agents assimilated the dis-

Scale deposit formed on the firebox, cross and roof stays and tubes, from untreated water

Interior of boiler and firebox showing the scale-free condition resulting from the use of treated feed water

solved oxygen, thereby eliminating the possibility of corrosion.

The Armand Integral Treatment, known as T.I.A. is a procedure which consists of introducing into the feed water a liquid or solid complex (in lumps or powder) formed of the mixture of sodium and potassium salts, found by experiment to be most suitable to the properties of the feed water, to obtain not only freedom from scale, but also reduction of priming. This can be effected by means of a feed regulator on the tender or locomotive, but also at a fixed feed point, if conditions are suitable. Only in the boiler, however, do reactions resulting in the formation of sludge and a corrosion eliminating condition obtain. It is thus a purely internal treatment. The quality of water taken along the entire route must be considered, and not merely at the depot at which the engine is based.

Blow Down

The sludge which collects at the bottom of the boiler is removed periodically by blowing down by means of a special blow-down valve described later. At the same time about 3 per cent of the boiler water is blown off in order to reduce salinity, and thus reduce the possibility of priming. In practice the heat loss involved represents less than 0·8 per cent of the total fuel consumption, and is considered unimportant when compared with the average fuel saving of 12·5 per cent gained by the T.I.A. treatment. Usually these sludge blow-down operations, which account for 98 per cent of all sludge removal, are performed at the entrance or exit from sheds according to local circumstances, although occasionally they are carried out on the line while running.

An important feature of the system is that of control. This falls into two parts. Firstly, the correct physical and chemical measures which must be taken to ensure that the feed water treatment being followed at any point is correct for the analysis of the water concerned. These tests, which can be carried out quickly and need only a simple apparatus, are necessary to enable corrective measures to be taken if incorrect treatment is being followed. Secondly, routine measures ensure the proper use of the complexes and apparatus, and that sludge removal and washouts are being carried out in the required manner.

It is important that both sludge removal and boiler washing are carried out thoroughly as prescribed. Sludge removals must be conducted at the proper intervals, and in order to make certain that this is done, each extraction and the amount of water blown off is recorded on the speedometer graph fitted to all S.N.C.F. locomotives. It is of equal importance that boiler washouts should be carried out thoroughly every 12,000 to 16,000 km. (7,500—10,000 miles).

Early Trials

Subsequent to the study and research carried out under Monsieur Armand, a series of trials were carried out at the Avignon depot. These experiments proved successful and the S.N.C.F. decided to treat, by the T.I.A. method, the feed water of boilers of locomotives stationed at five depots where the quality of water was particularly hard. Special trials were later carried out with three class "141R" locomotives Nos. 1157-9. The locomotives completed well over 1,000,000 km. (621,000 miles) without any heavy boiler repairs, at a depot which used some of the worst water on the railway. The results were considered sufficiently conclusive to warrant a final assessment, and it was decided to progressively extend the treatment to all steam locomotives.

To appreciate the result in terms of economy, it is necessary to examine the position as it was before T.I.A. was introduced. In the Mediterranean area where the water contains carbonates and sulphates, it was common for an engine evaporating 200 litres of water per km. (0·621 miles) (70 gal. per mile) to deposit scale at the rate of 10 to 20 grammes (0·35—0·71 oz.) per min. Even with the lime-soda treatment then in use this meant that 30 tons of scale would be deposited per 1,000,000 km. (621,000 miles); of this only 20 to 30 per cent could be removed by washout. Boiler washout took place every 800 to 1,500 km. (497—932 miles), and the distance between interim overhauls averaged only 70,000 km. (43,496 miles), with general overhauls requiring complete boiler repairs every 250,000 km. (155,534 miles). Apart from involving an average time of 6 hr. 41 min. for descaling and so on, after locomotives had completed 1,000 km. (621 miles), and also loss of conductivity because of the layer of scale, there was also considerable damage to the firebox caused by uneven heat distribution.

Where the scale was thick, the temperature of the firebox plates might increase from 230° C. to as much as 600° C. causing buckling, cracking, and so on. Add to this the cost of replacement of boiler tubes and other material, time out of service, and the high percentage of engine failures, and it becomes obvious that, on the amalgamation of the railways in 1938, one of the first priorities was to find an effective solution to the problem. Actual figures taken at random from the records of the depot at Nice for 1938 showed that Pacific locomotive No. 231.G.15 required an average of 23 hr. per 1,000 km. (621 miles) on boiler maintenance. Similar figures for locomotives Nos. 231.C.58 and 231.D.79 were 16 hr. and 21 hr. respectively.

Improved Operating

The introduction of the T.I.A. system had a marked effect upon running maintenance and periods between shops. Boiler maintenance has been reduced to one-eighth of the time formerly occupied. Improved evaporation has reduced fuel consumption from 19 per cent, and has greatly favoured the use of steel fireboxes. On average,

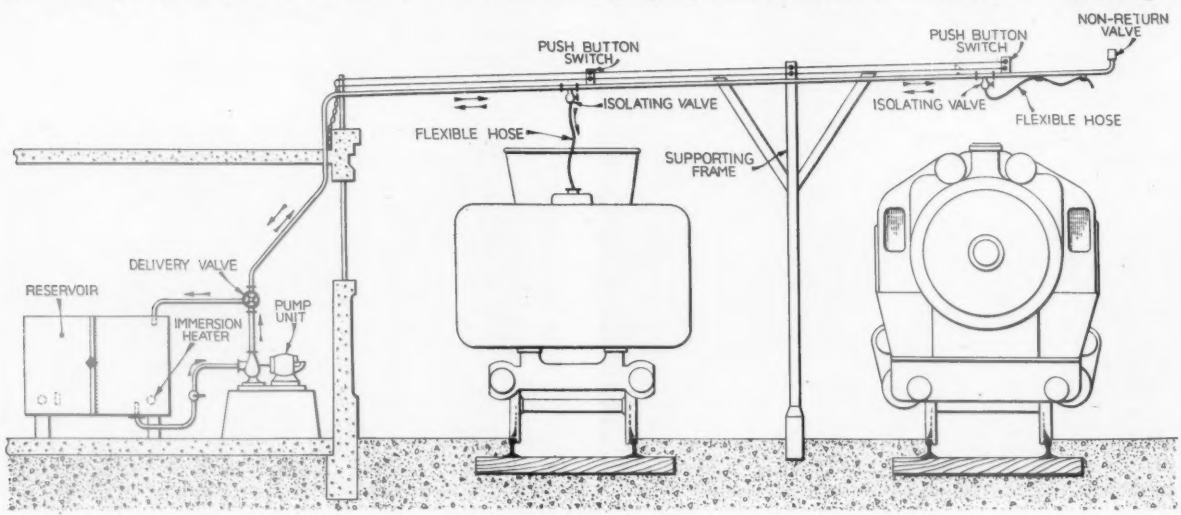


Fig. 1—Typical running shed installation, showing layout of feed water treatment equipment

each engine now operates 40 per cent more mileage, and this in turn has made possible a considerable reduction in the number in service, as well as a decrease in facilities. At Nice, before the installation of T.I.A., 106 locomotives operated an annual distance of 3,553,728 km. (2,205,800 miles), where today a complement of 41 locomotives is able to cover 3,220,306 km. (2,019,000 miles). The same depot records that in 1938 Pacific locomotives of the G, C and D types averaged about 20 hr. boiler maintenance per 1,000 km. (0·621 miles), as against roughly 30 min. at present for the much larger engines of the " R " class.

Boilers which were lifted at intervals of 70,000 km. (43,000 miles) because of bad water, are now lifted at distances almost twice this amount. In certain cases as much as 200,000 km. (124,000 miles) have been obtained before lifting has proved necessary; distances of over 1,000,000 km. (621,000 miles) have been exceeded.

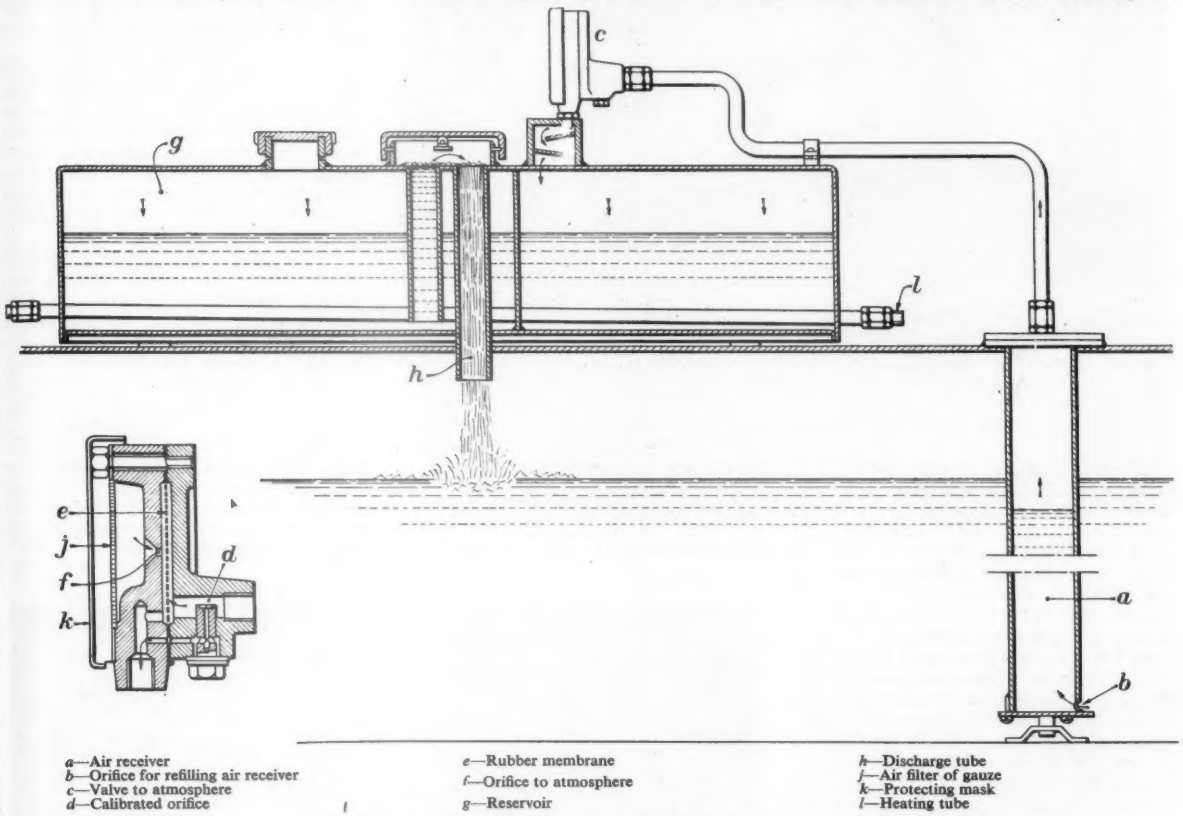
The treatment requires fairly simple plant at running sheds; a typical installation is shown in Fig. 1. A 2,000 litre (440 gal.) capacity tank, fitted with a contents indicator, which contains the feed water treatment liquid is connected to an electric motor-driven pump unit. A three-way delivery valve can be used for circulation of the fluid, returning it to the tank, or directing it to the overhead supply pipe which runs over the tracks supported at a convenient height by a suitable gantry. A flexible hose connected to the supply pipe is used to direct the liquid into the special container situated on the engines.

Locomotive Dosage Tank

The 100 litre (22 gal.) dosage tank mounted on the locomotive which is shown in Fig. 2, operates as follow. On filling the tank, water enters the tube *a*, via orifice *b*, and compresses the air which is pushed towards the valve *c* and divides in two air streams. One of these, reduced by the calibrated orifice *d*, flows towards the doser, and deforms the rubber membrane *e*, which tends to obstruct the orifice *f*, interrupting communication with the dosing reservoir *g* with the atmosphere, while water is being taken. Air which has not issued from the calibrated orifice *d*, enters the reservoir, where it displaces a volume of dosage roughly equal to the volume of water in tube *a*, the dosage is lifted in the plunger tube, and flows into the pouring tube *h*.

When the filling of the tank is stopped, the water tube-reservoir pressures are equalised by the calibrated orifice *d*. The membrane disengages from orifice *f*, allowing part of the air compressed in the reservoir to escape to atmosphere via the wire gauze filter *j*, which is protected by a mask *k*. This escape of air disturbs the relative pressures in the tube-reservoir circuit, which fluctuates rapidly until the tube-doser circuit is at atmospheric pressure. The membrane *e*, then at rest, allows air to enter the reservoir when the level of water falls in the tender and tube during the feeding of the boiler. The membrane also permits the evacuation of air when the dosage is heated by steam via the tube *l*, or the rise in ambient temperature expands the dosage, and the air in the reservoir.

The sludge removal blow-down valve, which is of special design, is mounted on the front plate of the firebox, just above the foundation ring. A short exhaust pipe of suitable length and shape leads from the valve to a cowled deflector which directs the sludge downwards. The valve consists basically of a piston and vertical spindle which is mounted to a chamfered-seat valve. A coiled spring holds the valve on its seat, preventing boiler water from escaping. When it is desired to blow off the sludge, steam is allowed to act on the top of the piston, depressing it and the valve, which allows the boiler water, and thus the sludge, to be drawn off via the exhaust port. To close the valve, the steam supply is shut off and the valve closes under the pressure of the spring. When the piston is depressed a small port is uncovered which allows steam pressure to be fed to a fitting on the speedometer recorder causing a record of the extraction to be made on the speedometer graph.

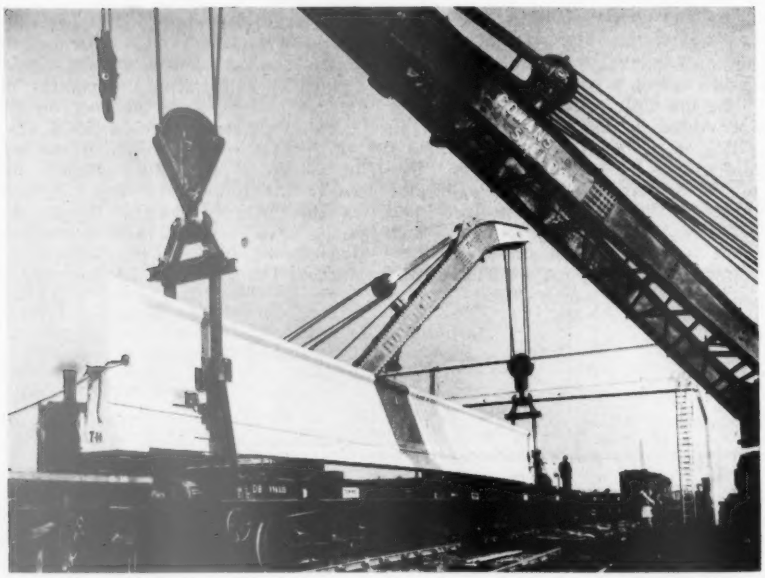


a—Air receiver
b—Orifice for refilling air receiver
c—Valve to atmosphere
d—Calibrated orifice
e—Rubber membrane
f—Orifice to atmosphere
g—Reservoir
h—Discharge tube
j—Air filter of gauze
k—Protecting mask
l—Heating tube

Fig. 2—Layout of equipment as installed on a locomotive

All-Concrete Footbridge at Scunthorpe

Pre-tensioned beams supported on pre-cast trestles



Lifting a main beam, using cradles with universal joints

THE Eastern Region has completed an all-concrete footbridge over 600 ft. long, to the east of Scunthorpe Station. There are five spans crossing five running lines and 22 sidings, with ramped approaches at each end. The five spans of the bridge total some 373 ft. in length and the ramped approaches are 125 ft. long on the Frodingham side and 120 ft. in length on the Scunthorpe side; the complete structure totalling about 620 ft. The bridge has an overall width of 7 ft. 4 in., overall height of 6 ft., providing a footway 5 ft. wide and 5 ft. in depth from path to parapet.

Concrete has been used throughout; employing metallurgical super-sulphated acid resisting cement with granite aggregates to produce a dense mix and a finish impervious to industrial fumes.

The bridge consists of pre-tensioned concrete beams 6 ft. in depth, varying between 67 and 86 ft. long, supported on pre-cast reinforced concrete trestles. The beams for the approaches are of reinforced concrete supported on trestles of similar construction and diminishing size from the bridge to the ramp ends. The bridge trestles are 19 ft. high and some 15 ft. wide at the base. The clearance above rail level to the top of the trestle is 15 ft. 7 in.

Between each pair of concrete beams forming a span of both the bridge and approaches, reinforced concrete spacer beams, 4 ft. 6 in. long, 1 ft. 9 in. wide, and 11 in. deep, have been placed at intervals of about 8 ft.

Each spacer beam was post-tensioned by four threaded steel bars passing through holes in the main beams and through the spacer beams themselves. The nuts were tightened using torque spanners, to 125 ft. lb., and the spacer beams were then pressure grouted.

The deck of the bridge is formed of hollow pre-tensioned concrete floor units each 4 ft. 7 in. long, 1 ft. 2 in. wide and 4 in. deep, bedded in cement.

The bridge was produced in its various sections at the contractors' factory and transported to the site at Scunthorpe. The trestles supporting the bridge were cast as complete units and weigh between 6 and 8 tons, as were the main beams which are between 30 and 35 tons each.

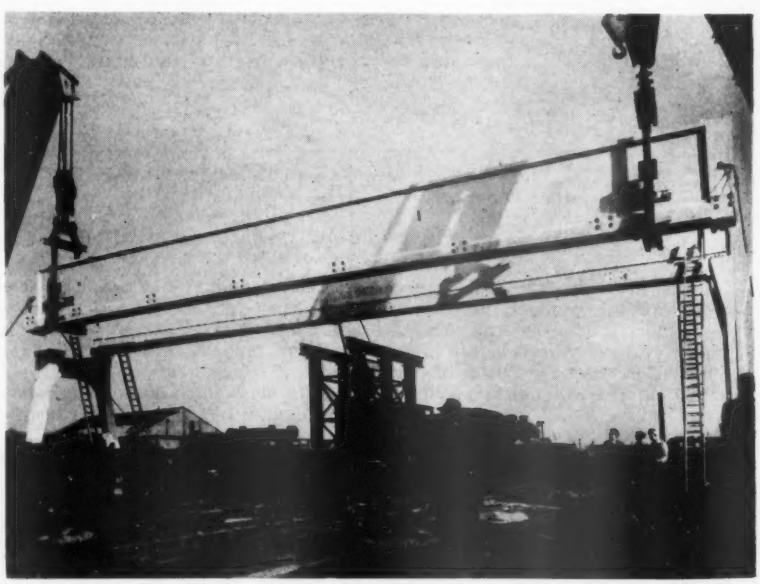
Erection

Span by span erection was carried out on Sundays to avoid interference with traffic. The trestles for the bridge were first erected and then the main beams positioned. The main beams were transported in pairs by a special train to arrive on site in time for each Sunday's work. On average, erection of one span took some 12 hr. using two railway breakdown cranes.

Considerable care was taken to avoid jarring or creating stresses in the large main beams as there is a tendency for them to shatter under these conditions. To avoid any turning or twisting strains being transmitted to the beams in the lifting and traversing operations, special lifting cradles were built incorporating a universal joint in the uprights.

To ensure that the lifting and manœuvring of the beams was correctly carried out, the crane positions and traversing arcs for the placing of each beam were marked out on the ground and these were followed during the positioning operations by plumb lines attached to the ends of the beams.

The bridge was constructed under the direction of Mr. A. K. Terris, Chief Civil Engineer, Eastern Region. The contractors were Dow-Mac (Products), Limited, of Stamford, Lincolnshire, and the consulting engineers were Messrs. Rendel, Palmer & Tritton.



Main beam being lowered into position; the structure in the centre of the span was used to steady the beam. Holes for post-tensioning of spacer beams by steel bars can be clearly seen

RAILWAY NEWS SECTION

PERSONAL

Mr. K. W. C. Grand, General Manager, Western Region, British Railways, has been appointed to the board of the Penarth Pontoon Slipway & Shiprepairing Co. Ltd. and its subsidiaries.

Shri K. Ramachandran, Additional Member (Mechanical), Indian Railway Board, has been appointed General Manager of the Chittaranjan Locomotive Works. He took up his new duties on March 4.

We regret to record the death on his birthday, April 1, at the age of 80, of Lt.-Colonel K. R. N. Speir, D.S.O., Chevalier of the Legion of Honour. Colonel Speir was Passenger Assistant to the Continental Traffic Manager, L.M.S.R., from 1927 to 1943, and, from that year until his retirement in 1954, Secretary (later Hon. Secretary) of the Transportation Club, London, S.W.1. He was educated at Radley and Pembroke College, Cambridge, and served an apprenticeship in the locomotive and electrical shops of the former Midland Railway. In 1902 he was appointed to take charge of the experimental and investigation office associated with Derby Locomotive Works, and in 1904 he became an Assistant to the Electrical Engineer. The following year he was appointed Secretary-General to the Egyptian State Railways, but returned to England in 1908 to take up an appointment as Assistant to Sir Cecil W. Paget, the then Chief General Superintendent of the Midland Railway. In 1914 Colonel Speir became Superintendent of Operation and, in 1919, was appointed Superintendent of Operation in charge of the London, Tilbury & Southend section. In 1924 he was appointed General Passenger Agent in Paris, and, three years later, Passenger Assistant to the Contintal Traffic Manager in charge of the then newly-established Continental Department of the L.M.S.R. He became Overseas & Continental Traffic Assistant to the Chief Commercial Manager in May, 1935, and retired from that position on December 31, 1942. He subsequently became the first Secretary of the Transportation Club which was inaugurated in January, 1953. Colonel Speir visited America on several occasions in connection with electric traction and railway operating matters. He saw active service in South Africa in 1900-1 as A.D.C. to the late General Sir Charles Parsons. In 1914 he joined the Royal Naval Reserve, but, in 1915, was seconded to the Royal Engineers, being placed in command of a group of R.E. Companies, Railway Operating Division. He was twice mentioned in despatches, received the D.S.O., was made a Chevalier of the French Legion of Honour, and was a Lieutenant-Colonel in the Regular Army Reserve of Officers. In 1946 a presentation was made to him on behalf of the Officers of the Canadian Movement Control "in appreciation of his many kindnesses."

The funeral service took place on April 4 at St. Paul's, Knightsbridge, where Colonel Speir was a Churchwarden.

B.-W. writes:—

The death of Colonel Speir will come as a shock to his many friends. Less than a fortnight ago he was present at the annual R.O.D. Dinner, delighting in reminiscences of the past and slightly critical of present day happenings. As late as last Saturday I received a cryptic but friendly note from him asking me to attend on Monday at his eightieth birthday celebrations with a few old friends. It was indeed a shock to arrive that evening and find that on that very morning he had passed to a higher service, which was so much to him.

"K," as he was affectionately known, had a rugged exterior, but a heart of gold. He was intolerant towards those who could not justify their values and quickly put in their place any who practised cant and humbug towards him, yet in the past few years a mellowness had developed, which no doubt is a privilege of old age.

To one who has known and enjoyed his friendship for nearly 50 years he was a lovable and courageous character. A quick-tempered rebuke would be followed equally quickly by an endearing smile and a kindly word. How well one remembers those war years, centred around his old and valued friend Cecil Paget who was always so much to him. Here indeed was a "David and Jonathan" friendship.

An outstanding man has left us. He will be well remembered in the years to come as a downright and straightforward character and at all times a very worthy gentleman. Heartfelt sympathy will go out to his widow and daughter in their great loss.

G.S.S. writes:—

Father Time has gathered another good railwayman of the old school and has taken from us Kenneth Speir.

Those who knew him best liked him best, for his qualities were not merely superficial and he had to be known to be appreciated: to many he was at first perhaps a little cold and unresponsive, but that was to give him time to size up a new acquaintance before accepting him as a friend, to see if beneath the exterior the newcomer was false or genuine—and to K.R.S. "genuine" meant straight, honest and fearless in expressing an opinion, sincere and of good heart; just the qualities he himself possessed.

But to those accepted as fulfilling these requirements and so privileged to become a friend of his, he was a delightful companion and it was a joy to see his wise old face break into a smile at some *bon mot* or pungent criticism.

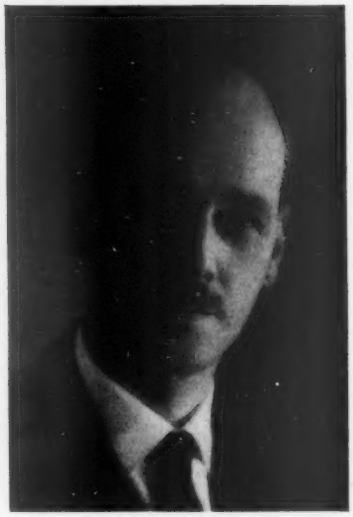
He was for many years (starting from its formation in 1943) the mainspring of the Transportation Club and when, in 1947, the Railways decided that the wartime reason for the Club had ceased, the Members, realising its value to the senior members of the transport industry, took over the Club and appointed Kenneth Speir the Honorary Secretary, he looked upon it as his own child, and as a true labour of love gave his services unstintingly to ensure its success; the Club owes him a deep debt of gratitude for his great work there, and the Members will ever remember him with affection.

To live in the hearts we leave behind is not to die—and Kenneth Speir has a permanent place in the hearts of a great many people both here, in France and in the United States.

The late Lt.-Colonel K. R. N. Speir
Secretary of the Transportation Club, 1943-54

British Road Services announces that Mr. A. J. Pragnell, Assistant Commercial Officer, B.R.S. Headquarters, has been appointed Commercial Officer, and will also act as Commercial Manager, B.R.S. (Contracts) Limited. Mr. Pragnell began his transport career with the Great Western Railway Company in 1914 and received training in all departments. In 1927 he was employed in the Road Transport Department and, in 1932, in the Development Branch of the Office of the Chief Goods Manager in connection with development schemes introduced on the goods side of railway and road transport working. In 1936 he was appointed Road Transport

Mr. C. E. Shaw
District Commercial Manager, Bristol, Western Region, 1954-57



Mr. A. W. McMurdo
Appointed District Engineer, Wolverhampton, Western Region

The late Mr. Leigh Ollerenshaw
Managing Director, Railway Signal Co. Ltd., 1946-57

Superintendent on the Nizam's State Railway in India. The following year he became Chief Commercial Manager, and, in 1940, Deputy General Manager. He joined British Road Services Headquarters in 1951 and, in the same year, was appointed Assistant Commercial Officer. Mr. Pragnell is an Associate Member of the Institute of Transport.

Mr. C. E. Shaw, District Commercial Manager, Bristol, Western Region, British Railways, who, as recorded in our March 22 issue, has retired after 44 years of service with the former G.W.R. and Western Region of British Railways, began his career at Reading in the office of the District Goods Manager in 1913. After service with H.M. Forces during the 1914-18 war he was employed at various stations in the Reading District until 1926, when he was selected for special training in all departments of the G.W.R. system. He was the first Junior Assistant District Officer to be appointed in the Goods Department, becoming Assistant to the District Goods Manager, Birmingham, in 1933. In that District he occupied successively the positions of Chief Clerk, Assistant District Goods Manager, and Goods Superintendent. In 1944 he became District Officer at Newport and later occupied similar positions at Swansea and Cardiff until his appointment as District Commercial Manager, Bristol, in 1954. Mr. Shaw has been a member of the Port Emergency Committees, Chambers of Commerce and Institute of Transport in those areas, being a Founder Member and Vice-Chairman of the South Wales Section of the Institute. He has always been interested in the activities of the Staff Association, was a Founder Member of the Birmingham Section of the Lecture & Debating Society, and largely responsible for the resuscitation of the Bristol Section, of which he became first President in 1955.

Mr. A. W. McMurdo, M.B.E., E.R.D., B.Sc., A.M.I.C.E., who, as recorded in our March 29 issue, has been appointed District Engineer, Wolverhampton, Western Region, British Railways, obtained his degree at Glasgow University and entered the service of the L.M.S.R. in 1932 as a civil engineering pupil in the Presidents' Scheme. Mobilised as a member of the Supplementary Reserve in 1939 he served at home and abroad in the Royal Engineers until 1946 when he was demobilised with the rank of Lieutenant-Colonel. During this period he was awarded the M.B.E.(Mil.) On his return to railway service Mr. McMurdo was appointed Outdoor Engineering Assistant to the District Engineer, Glasgow (Central). In 1950 he transferred to the Western Region as Assistant District Engineer, Plymouth, and while there attended a course at the Administrative Staff College, Henley-on-Thames. In 1953 he moved to Paddington in a similar capacity. In 1954 he was appointed District Engineer, Shrewsbury, the position he now vacates.

Mr. R. Burgoyne, Regional Establishment & Staff Officer, Western Region, British Railways, retired on March 30 after more than 50 years of service with the Great Western Railway and the Western Region.

Mr. R. A. H. Weight, for many years Publicity Officer of the Stephenson Locomotive Society, will relinquish his long official connection with that body tomorrow, April 6. Mr. Weight, who began his career with the Midland Railway in 1907 as a junior clerk in the office of the London District Traffic Superintendent, subsequently gained considerable experience in that area. He was elected a member of the Stephenson Locomotive Society Management Committee (later Council) in 1925 and served in this capacity until 1937. He also acted for periods as Assistant Librarian, Assistant Editor of the Society's *Journal*, and as Deputy Chairman. He was appointed Publicity Officer, then a newly-created position, in 1937. Since the recent war he has had charge of the *Journal* Back-Numbers Section, and, for nine years, has been solely responsible for the Society's personnel records and mailing arrangements, with an ex-officio seat on the council. During his 32 years of close voluntary association with the S.L.S. he has seen membership increase eight-fold, the establishment of a London headquarters, various provincial areas and centres, the acquisition of the L.B.S.C.R. locomotive *Gladstone*, and many pioneering excursions, visits, and tours. He has presented a number of papers and illustrated lectures in London and elsewhere and is the author and publisher of *Great Northern Locomotives*, 1847-1947.

The late Mr. Leigh Ollerenshaw, Managing Director of the Railway Signal Co. Ltd., whose death on March 8 was recorded in our last week's issue, was born in 1890 and educated at Aintree and Southport. He joined the Railway Signal Co. Ltd. at Fazakerley at the age of 15, and, after training in the Works Office, entered the Drawing Office of which he subsequently became Chief. In 1919 he was appointed Works Manager; in 1945, General Manager, and, in 1946, Managing Director. Mr. Ollerenshaw was well known to those connected with mechanical signalling at home and abroad. At the time of his death he had completed 51 years of service with his company. He was on the Executive Committees of the Engineering & Allied Employers' Liverpool Association and of the Liverpool Ironfounders' Association, and had served on the Tribunal of the Court of Referees. He had been a member of the Institution of Railway Signal Engineers since 1921 and was a member of the Liverpool Branch of that body and of the Institution of Permanent Way Engineers.

The following appointments have been announced by the London Midland Region of British Railways:—

Motive Power Superintendent's Department

Mr. H. H. Mason to be District Motive Power Superintendent, Carnforth.

Mr. J. T. Thatcher to be Assistant (Mechanical), Euston.

Carriage & Wagon Engineer's Department

Mr. A. S. Lowe to be Assistant Outdoor Carriage & Wagon Engineer, Derby Headquarters.

Mr. J. W. Oakton to be Assistant (Modernisation), Derby Headquarters.

We regret to record the death on March 12, in his 93rd year, of Mr. C. N. Goodall, O.B.E., M.I.C.E., M.I.Mech.E., Managing Director of Robert Stephenson & Hawthorns Limited from 1914 until his retirement in 1936. Mr. Goodall was educated at Bedford School and was an apprentice with the London & South Western Railway before joining Willans & Robinson of Glasgow, a

company which later became a part of the North British Locomotive Co. Ltd. In 1897 he joined the inspection staff of A. M. Rendel & Sons (later Rendel, Palmer & Tritton), and, in 1904, was appointed Manager of the Darlington Works of Robert Stephenson & Co. Ltd. On the reconstruction of the company in 1914 only the Darlington works were retained and Mr. Goodall was appointed Managing Director, which position he held until his retirement in 1936. At the request of the board he retained his directorship until 1944 and thus gave the company service over a period of 40 years.

The following appointments have been announced by the British Transport Commission:—

General Staff of the Commission

Mr. W. S. Morgan, Director of Funds, B.T.C. Headquarters, to be Director of Audit (located at Fielden House, 10, Great College Street, London, S.W.1).

Mr. N. R. Bellwood, Chief Financial Officer, British Road Services, to be Director of Funds & General Division, B.T.C. Headquarters.

Mr. G. Dickinson, Senior Costing Assistant, B.T.C. Headquarters, to be Principal Traffic Costing Officer, Paddington.

Mr. J. G. Smith, Assistant Traffic Costing Officer, Liverpool Street, to be Traffic Costing Officer, Liverpool Street.

Mr. A. F. G. Marshall, Senior Costings Assistant, B.T.C. Headquarters, to be Traffic Costing Officer, Waterloo (located at 237, Oxford Street, London, W.1).

Mr. L. P. Lewis, Assistant Traffic Costing Officer, Glasgow, to be Traffic Costing Officer, Glasgow.

British Railways Central Staff

Mr. R. G. Sell, Chief Assistant to Contracts Manager, British Insulated Callender's Construction Co. Ltd., to be Assistant (Fixed Equipment), Electrical Engineering Department (located at 14, Melbury Terrace, London, N.W.1).

Mr. P. Murdoch, Assistant Divisional Shipping Manager, Dover, Southern Region, British Railways, has been appointed Divisional Shipping Manager & Harbourmaster, Newhaven, with effect from August 1, succeeding Mr. R. J. Cardy, who will be retiring.

Mr. C. H. Titchener, Senior Executive Assistant, Organisation & Methods Section, Establishment Office, London Transport Executive, has been appointed Assistant (Organisation & Methods), Regional Establishment & Staff Office, Waterloo, Southern Region, British Railways.

Mr. A. P. Hunter, Chief Operating Superintendent, North Eastern Region, British Railways, retired on March 30 after more than 47 years of service. The accompanying photograph shows a presentation made by Mr. H. A. Short, General Manager of the North Eastern Region, on behalf of colleagues and friends.

Mr. E. Crabtree has been appointed Technical Sales Representative for the Midlands area of the Coventry Gauge & Tool Co. Ltd.

We regret to record the death in his 94th year of Mr. S. L. Murgatroyd, O.B.E., who retired from the position of Permanent Way Engineer, Southern Area, London & North Eastern Railway, in 1929. Before grouping he had served for many years on the Great Central Railway. He was President in 1938 of the Retired Railway Officers' Society.

Mr. M. F. J. Wright has been appointed Advertising Manager of Black & Decker Limited.

Mr. T. H. L. Parish, formerly Chief Instructor of F. Perkins Limited, has been appointed Sales Training Manager.

Mr. J. Cuthbert Robinson has been elected President of the Machine Tool Trades Association for the year 1957-58, in succession to Mr. H. P. Potts.

Mr. J. E. Smith has been appointed Secretary of Eastern Coach Works Limited, Lowestoft, as from April 1, 1957. He succeeds Mr. C. M. Woodburn, whose appointment into Crosville Motor Services Limited was recently recorded.

We regret to record the death, at the age of 81, of Mr. F. B. Greenwood, formerly Chief Engineer of the Manchester Ship Canal Company. On his retirement in 1945 he had completed 50 years of service with the company.

Mr. Alan Kiernan, Assistant Managing Director of Edward G. Herbert Limited, has relinquished that appointment and is retiring from the service of the company owing to ill-health. He retains his seat on the board.

Mr. M. J. J. Richards has been appointed to succeed Mr. W. J. Allen as Manager of the London Branch Sales Office of the British Aluminium Co. Ltd. when Mr. Allen retires on May 16.

Mr. S. J. Barnes, General Manager of Clayton Dewandre Co. Ltd., has joined the board of that company.

General Sir William D. Morgan resigned from the boards of Associated Electrical Industries Limited, Siemens-Ediswan Limited, Siemens Brothers & Co. Ltd. and the Edison Swan Electric Co. Ltd. on March 31.

We regret to record the recent death of Mr. Norman Cadman of the Traction Department of the General Electric Co. Ltd. Mr. Cadman had spent some 45 years in the electric traction industry. For the past eight years he had been in the G.E.C. Traction Department at Magnet House, London.

Mr. S. T. Stanbridge has been appointed Stationmaster, Charing Cross, Southern Region, British Railways.

Mr. Walter Wehtje, Managing Director of the Atlas Copco Group, is retiring on April 13. He will be succeeded by Mr. Kurt Allan Belfrage, Deputy Managing Director of the Group since 1955.

THE INSTITUTION OF CIVIL ENGINEERS

The following Graduates and Transfers have been announced by the Institution of Civil Engineers:—

Graduates

Mr. P. C. Loveys, Freeman Fox & Partners.

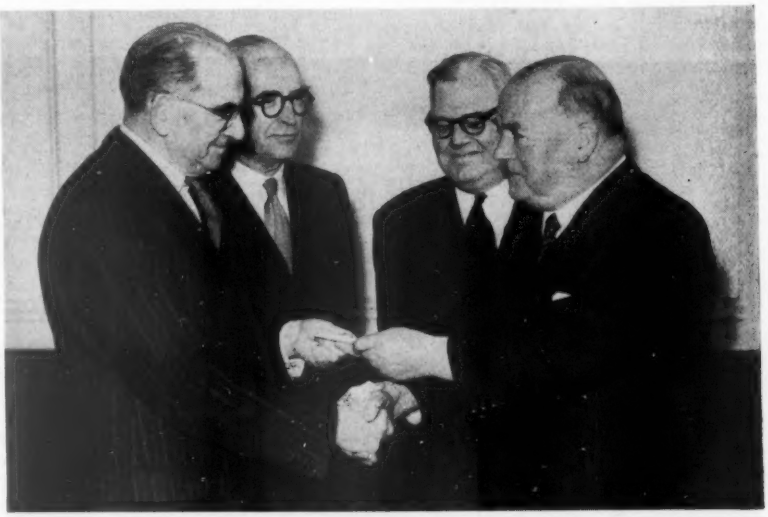
Mr. P. S. Tendolkar, Rendel, Palmer & Tritton.

Transfers

Mr. F. I. Childs, Rendel, Palmer & Tritton.

CROMPTON PARKINSON LIMITED DARLINGTON BRANCH ADDRESS.—Crompton Parkinson Limited announces that its Darlington branch has moved to new premises. The address is now King Street, Darlington. Telephone No. Darlington 5285/6.

EXPORT EXPRESS SERVICE EXTENDED.—British Railways, North Eastern Region, announced that their export express service, introduced in November last, has been extended as from April 1. This service, under which full truck-loads of freight for export via the Royal, India, and Millwall groups of London Docks, rail connected via Victoria Dock and Poplar, are given assured next-day arrival, is now available from Newcastle, Gateshead, Sunderland and Darlington. With this extension there are now 39 of the more important industrial centres in the country from which the export express service is available.



Presentation to Mr. A. P. Hunter (right), retiring Chief Operating Superintendent, North Eastern Region, British Railways (see accompanying paragraph). Photograph shows (left) Mr. H. A. Short, General Manager, North Eastern Region; Mr. A. R. Dunbar, Assistant General Manager (centre left) and Mr. F. H. Petty, Motive Power Superintendent (centre right)

NEW EQUIPMENT AND PROCESSES

Banknote Counting Machine

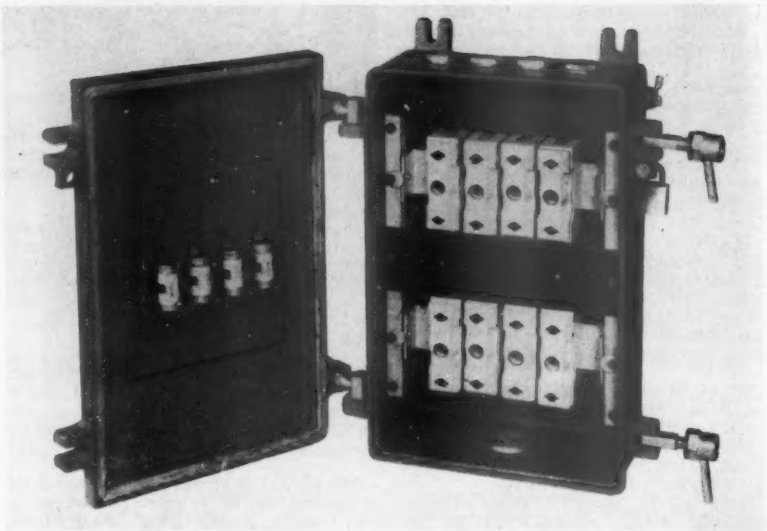
CENTRES such as large railway cashiers' offices and works wages offices afford scope for mechanised banknote counting. The ability to count banknotes at the rate of 16 per sec. so that a bundle of 100 can be counted in 7 sec. is the outstanding feature of a bank note counting machine which has recently been developed.

The unit, which weighs 100 lb. nett, measures 15 in. wide by 19 in. long by 9 in. high and will deal with banknotes whose size falls into the range of 4 in. x 2 in. to 10 in. x 4 in. The counting machine handles the notes by means of pneumatic suction.

Five spindles standing on a revolving disc, themselves revolve anti-clockwise to the right of the wad of notes. As each cam-shaped spindle touches a note, it is gripped by a strong air suction and gently pulled over to the right. An oscillating finger checks the notes as they pass and helps to avert the risk of miscounting particularly if the notes are used and creased.

The notes to be counted are inserted between a metal plate and a stop bar which ensures that they are correctly adjusted whatever their size. The notes are held by spring tension and counting starts as soon as they are in position and the machine is switched on. When the circuit is turned on a small red light shows the operator that current is flowing through the transformer. When the operator removes the notes after counting, the machine stops instantly.

A numbered gauge, with a capacity for totals up to 9,999, electrically registers the count. A flick of a switch returns the figures to zero at will if a recount is required for any reason. The machine costs £475 and delivery can be made in one month at present. The manufacturer is Thomas De La Rue & Co., Ltd., Bunhill Row, London, E.C.1.



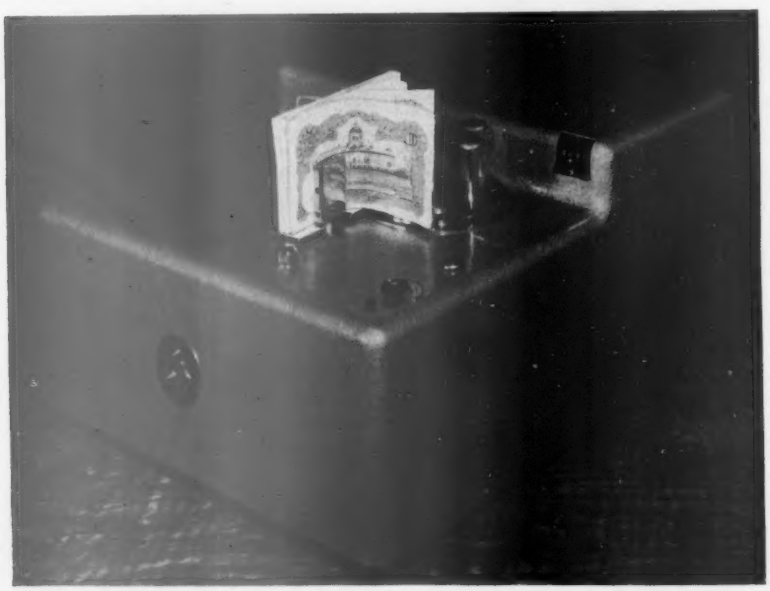
Weatherproof Distribution Boxes

IN marshalling yards, steam, and diesel locomotive depots and many other situations on railways, electrical distribution equipment is exposed to the effects of weather and severe atmospheric conditions. A range of weatherproof distribution boxes has been introduced in order to provide the maximum protection in these circumstances. The cases are of heavy cast iron, without any holes drilled through from outside to inside, and the cover retaining bolts incorporate toggles which, in conjunction with a greased hemp or sponge rubber gasket, ensure firm closure. The sides of the case are flared all round so that water or moisture which settles on top will not run inside the fuseboard when the case is opened. Vertical lugs provide a space behind the case when it is mounted on a wall or bulkhead so that moisture can run down at the rear. A sealing pin and Castell lock can be supplied if required. The pin can be placed in a neutral position when the cover does not need locking.

Fuse banks, to take H.R.C. or rewirable fuses, are mounted inside the case in a position which leaves ample depth at the rear. They are located on axial pins and locked in place by eccentric washers, release of which enables a bank to be tilted forward or backward to facilitate wiring.

The cases are available in two sizes and provide for 31 different arrangements of fuses, with a maximum of 12 ways in a 20A. T.P. & N. board.

The distribution boxes are made to special order by the General Electric Co. Ltd., Magnet House, Kingsway, W.C.2.

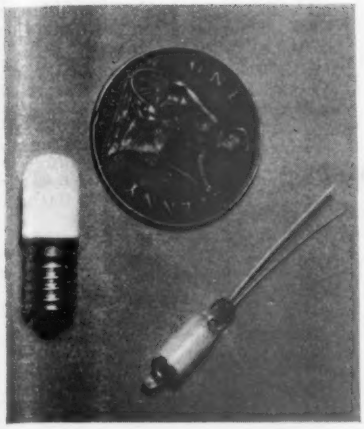


Coloured Miniature Lamp

MINIATURE fluorescent indicator lamps, stated to be the first to be produced in this country in colour, are now being marketed. The lamps, designed to meet the growing demand for an alternative colour to the standard neon, are suitable for train control circuit diagrams and so on.

At present they are only being produced in green, but other colours may become available in the future. The lamps are independent of transformer windings, or special low-tension supplies, and can be run continuously, or rapidly flashed, without risk of sudden failure.

They are designed to operate on 200-250 V. a.c. supplies with a series resistance, consumption, being in the region of 0·1 W., is regarded as negligible. The illustration shows two of the three types of lamp at



present being produced compared for size with a penny. On the left is a screw cap version, the other is a wire-ended type which is soldered to place. The third model has a bayonet cap.

Prices of single lamps are 2s. 8d. and 3s. 9d. for the wire ended, and screw and bayonet cap types respectively. Considerable reductions are made for bulk orders. Delivery is from stock. The manufacturer is Hivac Limited, Stonefield Way, Victoria Road, South Ruislip, Middx.

Concrete Floor Coating

EXON Floor Coating has been developed to provide a durable, hard-wearing surface for concrete, stone, and similar floors and to meet conditions which obtain, for example, in railway workshops and depots. Instead of lying on the surface, Exon is stated to penetrate right into the flooring material.

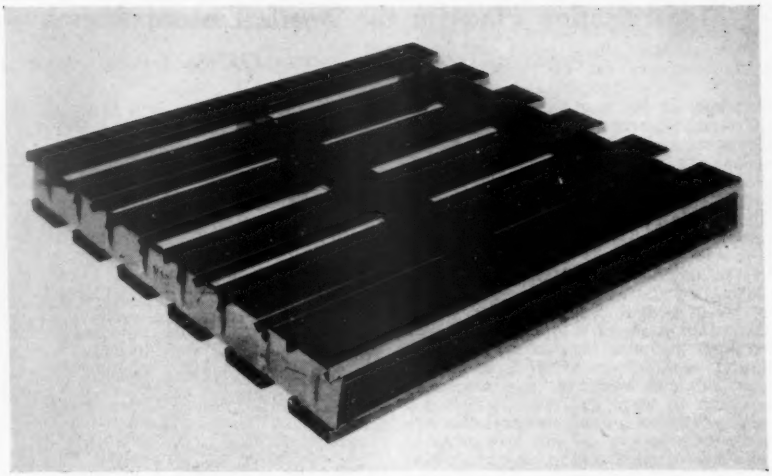
After treating with Exon, a concrete or stone floor becomes harder than in its natural state; the surface is bound, increasing its resistance to wear and abrasion. Also, due to its special penetrating effect, Exon seals the floor and stops surface disintegration of concrete, preventing the formation of dust. The use of the product is also stated to give resistance to acid and alkali solutions of moderate strength as well as paraffin and petrol splashes.

The covering dries quickly, after three hours it can be walked on, and can be applied by brush or spray. Although Exon is available from stock in grey, stone or tile red, special colours can be supplied for orders of 50 gal. and over. It is obtained in 1-gal. and 5-gal. drums.

The price is 65s. a gal.; prompt delivery can be made. The manufacturer is the South American Minerals & Products Co. Ltd., 26-27, Cowcross Street, London, E.C.1.

Cutting Compound for Difficult Materials

THE difficulty of machining many modern alloys such as stainless and other alloy steels, nickel and light alloys, can be greatly reduced by the use of a cutting fluid known as R.T.D. Applications include the machining of stainless steel for locomotive valve gear and rolling stock service connections, and the drilling of tough alloy steel couplers for rolling stock.



R.T.D. has been developed as a lubricant for conditions where extreme pressures bear on the tool and frictional heat, wear and seizure are also experienced, reducing friction at low cutting speeds and preventing welding when speeds are high. An improved surface finish often results from the use of the fluid and there is no corrosion of tools and work.

R.T.D. is usually applied neat to the leading edge of the tool by brushing, or direct from a tube or feeder.

If necessary, it may be mixed with an equal volume of paraffin and used on machine tools with sump circulation. With work hardening steels the compound is applied direct to the tool and the coolant directed at the work.

Instances of improved cutting performance of components for locomotives during testing of the product include the drilling and tapping of holes in EN9 forged steel rocker levers for diesel engines and the tapping of ¼ in. holes in locomotive boiler steel, in the latter case, the tapping speed being trebled and the life of the drill increased by some six times before regrinding.

The illustration shows the surface finish of an aluminium component milled using ordinary lubricants (left) and using R.T.D.

Delivery is from stock. Price is available on application to the manufacturer, Rocol Limited, Ibex House, Minories, London, E.C.3.

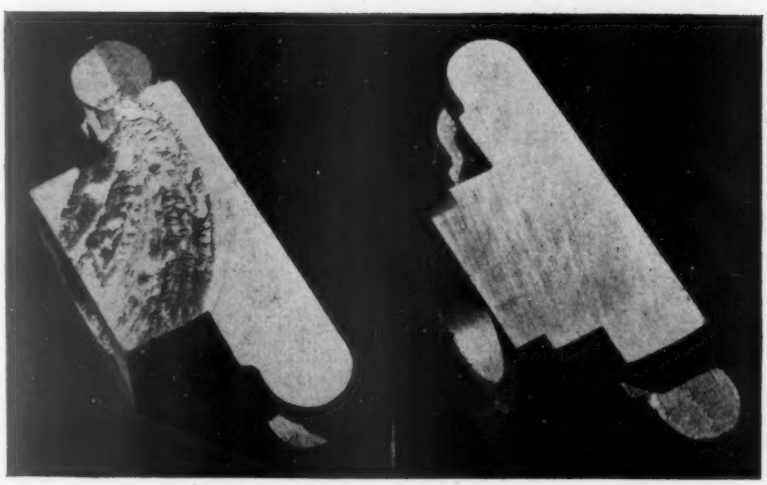
Flat Steel Pallets

A FLAT steel pallet which couples a high strength to weight ratio with low cost has been evolved, and will be known under the trade name Flowstack.

The pallet, with world patents, comprises V-section cross bearers, ribbed for additional strength, fusion welded at all points of contact to "V" shaped longitudinal flanges which form the seating base of the pressed steel slats. The resulting pallet is stated to be exceptionally robust and rigid. Tests have shown that a 48 in. x 48 in. pallet of 2 tons nominal capacity can support a maximum stack loading of 10 tons. The Flowstack pallet is a two-way entry type, of reversible or non-reversible pattern for handling by fork lift or hand pallet truck (suitably modified base slats being incorporated for the latter) and provision can also be made for crane slings if desired.

Owing to the simplicity of fabrication and the use of steel sections which can be cut to any size, it is not intended to lay down a standard range. The manufacturer will supply pallets to size and capacity to suit individual requirements.

Delivery is expected to be in the region of six weeks from the date of order. Quotations will be given on application to the manufacturer, Fisher & Ludlow Limited, Bordesley Works, Birmingham 12.



Modernisation Plans in the North Eastern Region

Proposals for improvements in 1957-58

Details of the modernisation plans for the North Eastern Region of British Railways, announced recently, include the provision of facilities for fitting wagons with the vacuum brake at York, Shildon, Newcastle Walkergate, and Hull Springhead. The concentration of freight traffic on a smaller number of fully modernised terminals is envisaged. The depots at Darlington, York, and Scarborough have been modernised and within the next two years it is proposed to begin work on modernising four more of the important freight terminals in the Region. The goods station at Stockton South is to be remodelled, and work on this scheme is expected to start this year. The new terminal will enable sundries traffic now being dealt with at Middlesbrough to be concentrated on Stockton, giving a better service. Similar schemes are envisaged for Hull English Street, Newcastle Forth, and Bradford Valley.

The superstructure of the West Blyth staiths, over which 1,000,000 tons of coal are shipped each year, is being strengthened to make the staiths capable of dealing with the new 24½-ton mineral wagons and with diesel shunting locomotives. It is expected this work will be completed in 1958.

More than 400 main-line freight trains work into or through York every 24 hr. and general freight working will benefit greatly by two modernisation schemes planned for this focal point. Consideration is being given to the remodelling of the south end of Dringhouses Up Yard, now used exclusively for express freight trains, and to the combination of the up yards at York into one through yard.

Passenger Traffic

Work will begin this year on improvements at Wakefield Westgate and Sunderland stations, the remodelling of Leeds City station to take the traffic now dealt with at Leeds Central and general improvements at Huddersfield. At Leeds, the construction of a new line between Beeston and Churwell is contemplated so that trains from Kings Cross and Doncaster will be able to run direct into Leeds City.

Diesel Traction

A further 60 diesel shunters will be introduced during 1957-58, and by the end of 1958 it is hoped to complete the conversion to diesel traction of branch-line services in County Durham and the Hull area, and to have extended the diesel services now operating in the West Riding. It is also hoped by then that the Leeds-York-Scarborough services will be diesel worked, and also the Middlesbrough-Newcastle and Newcastle-Carlisle services.

To cater for the maintenance and servicing of the new diesel trains, the South Gosforth sheds are being equipped to deal with the 134 diesel vehicles which will ultimately be operating in the Newcastle area, and this work is nearing completion. A sub-depot for diesel units will also be required at Sunderland and it is expected work on this depot will start in 1958.

At Darlington, a completely new diesel depot, designed to service 130 diesel vehicles, is being built at Haughton Bridge, just north of Darlington station, and will be completed this year. At Hull the motive power depot at Botanic Gardens is to be converted to a diesel depot and work on the first stage has already commenced.

The construction of an up slow line between Pilmoor and Alne is planned to start in 1958. This will complete the quadrupling of the main line between York Skelton and Northallerton. In addition, colour-light signalling is to be installed on the slow lines between Pilmoor and Thirsk. When implemented, these schemes will facilitate the working of traffic over the main line and make possible the diversion of freight trains to the main line from the Leeds-Harrogate-Northallerton line, over a part of which double-heading is necessary.

A further contribution towards smoother running and easier maintenance will be made by the use of long welded rails. For the welding of these rails a depot is being constructed at Dinsdale, near Darlington, and it may be necessary to establish a similar depot in the West Riding.

A start will be made this year on certain preliminary engineering work on the track and on bridges in connection with the electrification of the East Coast main line in the North Eastern Region.

Work on the new signalling installation at Newcastle is progressing and is expected to be completed in 1958. The existing electro-pneumatic signalling is being replaced by a colour-light route-relay installation in which the work now performed in the three existing signalboxes at Newcastle Central and the Manors Junction box will be concentrated in one new box.

The present manual signalling at Huddersfield is being replaced and a new power-operated colour-light installation is being provided. Planning work is proceeding and it is expected the installation will be brought into use in 1958. The work of two signalboxes is being concentrated into one and there will be provision for extension at a later date.

Schemes for the extension of colour-light signalling to the main line between Newcastle and Berwick and between Selby and York are being prepared. Work on these schemes may begin during 1958.

British Railways Summer Passenger Services

Accelerations on L.M.R. Midland Division main line: many more diesel services

More fast trains between England and Scotland and additional "car-sleeper" overnight services for motorists will be important features of British Railways summer timetables, which will come into operation on June 17. It is announced that, in all, 98 long-distance trains will be speeded-up to save 10—75 min. and 84 (65 last year) will make non-stop runs at an average speed of 60 m.p.h. or more.

Two new fast named trains, the "Caledonian" between Euston and Glasgow Central, and the "Morning Talisman," to run between Kings Cross and Edinburgh Waverley in 405 min., are referred to editorially on page 382. The present fast afternoon services between Kings Cross and Edinburgh will continue to run during the summer and will be named "Afternoon Talisman."

Other new Anglo-Scottish trains will include Sunday afternoon fast services between Kings Cross and Waverley, and a Saturday morning service from Peterborough to Edinburgh to cater for holiday traffic from intermediate stations on the East Coast route.

The 9 a.m. train from St. Pancras to Waverley, which will be re-timed to start at 9.15 a.m., will be speeded up by 40 min., and the 10.5 a.m. train from Waverley to St. Pancras will also be accelerated by 26 min.

Car-sleeper Services

A new car-sleeper train will run from Marylebone to Glasgow St. Enoch on Monday and Wednesday nights, and from Glasgow to Marylebone on Sunday and Tuesday nights, whilst the present service between Kings Cross and Perth will be augmented by a duplicate train on three days a week each way between Marylebone and Perth.

L.M.R. Midland Division

As a result of track improvements on sections of the London Midland Region main line, the whole of the daytime services between St. Pancras, Leicester, Nottingham, Derby, Sheffield, and Manchester are being revised on a regular-interval basis. Additional semi-fast trains will be introduced to enable long distance trains to omit certain intermediate calls and revert to prewar timings, with savings of up to 61 min.

Other improvements to main-line services will include re-timing of the "South Wales Pullman" between Paddington and Swansea, which will call additionally at Bridgend and Neath. Several trains between Waterloo and Bournemouth will be speeded up to complete the run in 2 hr. Certain of the pre-war services between London Bridge and Brighton will also be restored on an hourly interval basis.

Diesel Services

A number of new local suburban and main line diesel train services will be put into operation in the following areas at the beginning of the summer service:—*Eastern Region*: between Upminster, Ockendon, Grays, and Tilbury Riverside; *London Midland Region*: between Manchester and Crewe; *Southern Region*: between London and Hastings via Tunbridge Wells; *Western Region*: between Birmingham and Swansea, also local and suburban services radiating from Birmingham Snow Hill to Leamington and Stratford-upon-Avon, Bewdley, and Wellington (Salop), whilst it is also hoped, starting in August, to run diesel services between Newport and Blaenavon, Newport, and Brynmawr, and Aberbeeg and Ebbw Vale.

More 10-car Electric Trains

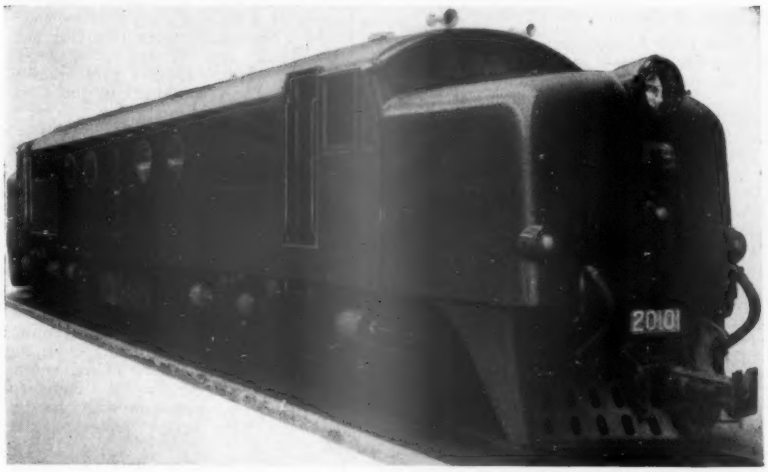
The completion of platform alterations at Cannon Street Station will enable a hundred 10-car electric trains to be dealt with at Charing Cross and Cannon Street during the morning and evening peak hours.

Refreshments and Seat Reservations

Restaurant, Pullman, buffet or cafeteria facilities will be available in 775 trains on weekdays, 887 on Saturdays and 373 on Sundays. Seats will be bookable in 929 weekday (Monday-Friday) trains, 1,292 on Saturdays and 391 on Sundays.

Diesel-Electric Locomotives for Malayan Railway

English Electric 1,500-*h.p.*, 96-*ton, metre-gauge units*



One of twenty 1,500-*h.p. diesel-electric locomotives ordered for the Malayan Railway*

Mr. C. G. Harrison, General Manager of the Malayan Railway, on March 27 formally received from Mr. H. G. Nelson, Managing Director of the English Electric Co. Ltd., the first of twenty 1,500-h.p. diesel-electric locomotives in the presence of the Commissioner for Malaya, Enche Othman Bin Mohamed; the Senior Crown Agent for Oversea Governments & Administrations, Sir George Seel; Mr. L. H. Short, General Export Manager, English Electric; and Mr. W. Shorrock, Manager, English Electric, Preston.

Although English Electric-built diesel-electric units have been operating on the Malayan Railway for some eight years, in the form of 350-b.h.p. shunting locomotives, the twenty 1,500-h.p. diesel-electric locomotives represent the first main-line units of this type for this railway. It is planned to convert to diesel traction the 488 miles from Singapore through Kuala Lumpur to Prai (Penang) and some of the newly ordered units will be used for this purpose.

The locomotives, of the Co-Co wheel arrangement, are powered by an English Electric 12-cylinder, V-form engine of the SVT range, which is rated at 1,500 b.h.p., and is pressure-charged by means of two Napier exhaust-gas turbo-chargers mounted on the engine above the main generator. The engine is of monoblock construction with separate cylinder heads bolted to the crankcase casting and renewable wet-type cylinder liners.

The power unit is close-coupled to the main generator of 1,000-kW., 660-V. d.c. output which has a separately excited 110-V. supply, and also drives the 45-kW., 110-V. auxiliary generator for control, battery charging and other auxiliaries. The main generator is a single bearing unit while the auxiliary generator is overhung on the main generator shaft.

The six driving motors, with a one-hr. rating of 195 h.p., are nose-suspended, series-wound, six-pole interpole machines, each driving an axle through single reduction spur gearing. They are permanently connected in three parallel groups of two in series and are force-ventilated by two blowers, one mounted in each nose compartment of the locomotive.

The overall design generally follows normal practice of the manufacturer. The floor plate of the underframe is unbroken throughout its length to eliminate dirt from the track entering into the equipment compartments. The two driving cabs extend over the full width of the locomotive, with the driving position arranged at one side of each cab, permitting the locomotive to be driven in either direction. The nose compartments in front of the driving cabs contain the traction motor blowers and vacuum brake exhausters.

The superstructure frame is of the usual fabricated construction, from rolled steel sections and covered with steel sheet. Four circular windows are fitted on each side of the engine compartment.

The cast-steel bogies have the spring gear incorporated between the road wheels and the bogie frame, and between the bogie frame and the superstructure with the swing link suspension.

Fuel is carried in a 750-gal. tank underslung from the locomotive underframe between the two bogies. The batteries are mounted on either side of the fuel tank for accessibility. When required, two locomotives may be coupled together and operated in multiple unit.

Engine Control

Continuous engine speed control with torque control throughout is achieved by the standard English Electric arrangement. Brake equipment is of the Gresham & Craven augmented vacuum type, two Northey exhausters being fitted to supply the needs of this system. Six vacuum brake cylinders are fitted to each bogie. A dead-man's foot treadle is fitted at the lower side of the driver's footrest. A Westinghouse E25A compressor supplies air for the electro-pneumatic engine control, sanding and so on.

Leading particulars of the locomotives are as follow:—

Weight in working order	96 tons
Maximum axle load	16 tons
Length over buffers	52 ft. 10 in.
Width over body	8 ft. 10 in.
Overall height	11 ft. 7½ in.
Bogie wheelbase	12 ft. 9 in.
Bogie centres	27 ft. 9 in.
Maximum tractive effort	54,000 lb.
Continuous tractive rating	31,050 lb. at 13 m.p.h.
Maximum service speed	60 m.p.h.

CHOCOLATE-AND-CREAM LIVERY FOR THE "MERCHANT VENTURER."—Since April 1, the "Merchant Venturer" has joined the ranks of other well-known Western Region named trains which have reverted to the original G.W.R. chocolate-and-cream livery. The "Merchant Venturer" leaves Paddington for Bath, Bristol, and Weston-super-Mare at 11.15 a.m. each weekday and returns from Weston-super-Mare at 4.35, Bristol at 5.27, and Bath at 5.49 p.m.

Handing over the locomotive ; (left to right) Mr. W. Shorrock, Mr. C. G. Harrison, Enche Othman Bin Mohamed, Mr. H. G. Nelson, Sir G. Seel, Mr. L. H. Short

Parliamentary Notes

Gowers Report

Mr. R. A. Butler, Secretary of State for the Home Department and Lord Privy Seal, stated in the House of Commons on March 28 that he saw no chance of introducing a Bill dealing with the Gowers Report on the conditions of employment on the railways during the present Session. Mr. Butler was speaking in his capacity as Leader of the House.

Questions in Parliament

Staggered Hours

Mr. Ernest Davies (Enfield, E.—Lab.) asked the Minister of Transport & Civil Aviation on March 20 what action had been taken, following the inquiry into starting and finishing times of work instituted by the Committee for Staggering of Working Hours in Central London, and otherwise to relieve traffic congestion by staggering the hours of work.

Mr. Harold Watkinson: After its preliminary review the Committee is tackling the problem by dividing Central London for this purpose into zones, each with a widely representative sub-committee to work out and progress a scheme for each zone. Further information is being provided by the travel census now being taken by the B.T.C. Good progress is being made outside the central area in discussions between London Transport and education authorities. Fourteen schools have already changed their hours.

Mr. Davies asked whether it would not be advisable to undertake an educational campaign among the travelling public in order to get them interested in continuing the staggering of hours even after petrol rationing has ended.

Mr. Watkinson: In conjunction with the London Transport Executive and British Railways, we are shortly going to start a publicity campaign, which I hope will do some good.

Safety on the Underground

Mr. H. E. Atkins (Merton and Malden —C.) asked the Minister of Transport & Civil Aviation on March 27 whether he was satisfied that his regulations for the safety of passengers on the London Underground are adequate during the present period of fuel shortage which greatly increases the numbers of passengers travelling at peak periods; and if he would make a statement.

Mr. Harold Watkinson, in a written reply: I am satisfied that my requirements, which govern the construction of underground railways and their rolling stock, are adequate. Otherwise I have no regulations, and responsibility for the safety of passengers under all conditions rests with the B.T.C. I am satisfied that this responsibility is properly fulfilled.

Sierra Leone Railways

Mr. Maurice Orbach (Willesden E.—Lab.) asked the Secretary of State for the Colonies on March 13 what was the number of miles of railway tracks and surfaced roads in the colony and protectorate of Sierra Leone, respectively; and what plans had been made for increasing rail and road transport.

Mr. John Profumo, Under-Secretary of State for the Colonies: The Sierra Leone Railway has 339 miles of track, of which 46 miles is in the colony. Over £3½ million are being spent on improvements.

There are 90 miles of tarred road in the colony and 42 miles in the protectorate. Under the current development programme a further 190 miles of protectorate road will be tarred and twelve major bridges are being built.

Carriage of Calves

Colonel Sir Alan Gomme-Duncan (Perth & East Perthshire—U.) asked the Secretary of State for Scotland on March 5 if he was now satisfied with the feeding arrangements made for young calves in transit by rail.

Lord John Hope, Joint Under Secretary of State, in a written reply, stated that arrangements were satisfactory but if the Minister's attention was drawn to any instance where feeding arrangements were unsatisfactory he would gladly make enquiries.

MacBrayne's Charges

Mr. John Macleod (Ross and Cromarty —N.L.C.) asked the Secretary of State for Scotland on March 27 why David MacBrayne Limited made a general practice of increasing its freight charges in step with increases on the railways.

Mr. J. S. Maclay: Proposals to change MacBrayne's sea freights and fares require the consent of the Minister of Transport & Civil Aviation who consults me first. They are considered on their merits with due regard to the general level of transport charges in the country as a whole, of which railway charges are an important indication.

Staff and Labour Matters

Application of Railway Pay Increase

Difficulties arose last week in connection with the offer by the B.T.C. to improve the rates of pay of railway salaried and conciliation staff by 5 per cent. At a meeting between the Commission and the three railway trade unions on March 27 the T.S.S.A. accepted the Commission offer to improve the rates of pay of railway salaried staff by 3 per cent from November 26, 1956, and by 5 per cent from March 4, 1957 (in substitution of the 3 per cent) on the basic rates of pay in operation before November 26, 1956. It also agreed to accept similar conditions to those accepted by the N.U.R., to which reference was made in last week's issue.

The A.S.L.E.F. informed the Commission that while it would be able to accept an offer to increase wages by 5 per cent, it was not prepared to subscribe to the agreement which has been made between the Commission and the N.U.R. in so far as it concerned the co-operation of the staff in improving productivity and efficiency and periodic reviews of wages and salaries.

The Commission informed A.S.L.E.F. that it could not conclude an agreement with it on this basis because the agreement already accepted by the N.U.R. and T.S.S.A. and offered to A.S.L.E.F. had to be treated as a whole; those parts of it to which A.S.L.E.F. took exception were integral parts of the offer made to it.

In the circumstances the Commission has arranged to implement the agreement reached with the N.U.R. and T.S.S.A. to the wages and salaried staffs covered by agreements between the Commission and those unions, but in view of the present attitude of A.S.L.E.F. the Commission to its great regret has not been able to apply the same terms to the footplate staff of British Railways. The footplate staff will continue to be dealt with under R.S.N.T. No. 19 which awarded a 3 per cent increase from November 26, 1956.

The Commission emphasised that its offer to A.S.L.E.F. remained open. It found it difficult to believe that the executive of A.S.L.E.F., from whose members the Commission were receiving such loyal service and co-operation, would persist in a refusal to give those reasonable undertakings contained in the Commission offer.

The N.U.R. and A.S.L.E.F. held separate meetings on April 1 to discuss the recent wage agreement and in particular the position so far as it affects railway footplate grades. No statement was issued after the N.U.R. meeting but it is understood A.S.L.E.F. has stated that it has certain proposals to put to the Commission.

Engineering and Shipbuilding Pay

At the beginning of the week strenuous efforts were being made to bring to an end the strikes which had been called among workers in the shipbuilding and engineering industries in connection with the disputes which have arisen regarding pay claims.

The shipbuilding employers have made an offer to improve the rates of pay of shipbuilding workers by 5 per cent but this has not been accepted and a court of inquiry has been set up by the Minister of Labour.

The engineering employees have had an offer of a 3 per cent increase which has been rejected and the Minister of Labour has, therefore, appointed a court of inquiry in an attempt to resolve the impasse.

As we went to press it had been agreed that work in both industries should be resumed from April 4 pending the findings of the courts of inquiry. The unions had not committed themselves to accepting the findings of the courts, but both sets of employers had agreed to abide by them.

DUNDEE TAY BRIDGE STATION TO BE MODERNISED.—A modern centralised ticket and enquiry office with convenient access to platforms and trains is to be provided for Dundee Tay Bridge passenger station. The work should be completed in about 18 months. The plan includes the provision of a new station forecourt adjacent to the present Dundee West goods yard, with a modern frontage building at street level. This building will accommodate the booking hall with combined ticket, enquiry, and reservation office. Four Hygiaphone booking windows in clear glass will be fitted in the ticket office. Modern standard Bellmatic ticket equipment will be installed. Two glazed entrance doors will lead from the forecourt to the booking hall and a separate entrance door to the enquiry and reservation office. In the booking hall the wall finishes will be of facing brick and natural wood veneers. The ceiling will be of metal acoustic tiles. The floor will be finished with heavy-duty rubber tiles. Central heating will be installed throughout the buildings. The new frontage entrance building will have a reinforced concrete structural frame with light coloured facing brick walls and glazed curtain walling. The booking hall will extend the whole length of frontage and be two storeys in height. The station accommodation, including passenger waiting rooms, will be modernised and refitted.

Contracts and Tenders

The British Transport Commission announces the placing of contracts for 60 complete Bo-Bo main line electric locomotives and 40 equipments for locomotives to be built in British Railways workshops. The locomotives are of two types, "A" and "B," each of 3,300 h.p. but with different gearing. Type "A" is designed to haul express passenger trains of up to 475 tons at speeds up to 100 m.p.h., or mineral trains of up to 950 tons at 55 m.p.h., and type "B" has a maximum speed of 80 m.p.h. but can haul mineral trains of up to 1,250 tons at 55 m.p.h. The locomotives will operate on the lines to be electrified at 25,000 V. 50-cycles between Crewe - Manchester and Crewe-Liverpool. The contract is valued at some £6,000,000 and delivery will start towards the end of 1958 and be completed in 1960.

The British Thomson-Houston Co. Ltd. will supply 20 locomotives of type "A" and five of type "B," and also 40 equipments for type "A" locomotives. The English Electric Co. Ltd. will supply 10 locomotives of type "A" and five of type "B." The General Electric Co. Ltd. and Metropolitan - Vickers Electrical Co. Ltd. will each supply five locomotives of type "A" and five of type "B." The mechanical parts of the locomotives being supplied by G.E.C. will be built by the North British Locomotive Co. Ltd.

The Hansa works at Bremen is to construct a series of 40 sleeping cars for the International Sleeping Car Company, to be of the "universal" type (Type U) in which each compartment can be equipped with one, two or three berths according to demand.

British Railways, London Midland Region, have placed the following contracts:—

Smith & Allcock Limited, Manchester, 16: improved amenities, workshop and stores, Weaste Junction

L. Fairclough Limited, Adlington, Lancs: reconstruction of bridge No. 45. Howe bridge at Eccles, Tyldesley and Wigan lines

Renovators (Provincial) Limited, Manchester 16: lump sum contract, labour only, cleaning and painting, goods depot, Coventry

Leonard Fairclough Limited, London, N.W.5: reconstruction to drainage system in up and down cesses. 61 m. 943 yd. to 61m. 1,574 yd. Roade-Northampton

A. Cameron Limited, Sutton, Surrey: lump sum contract, labour only, cleaning and painting, Manchester district bridges; Manchester-Bolton line, Manchester Exchange-Liverpool Lime Street line, and Manchester loop line

Wilson Lovatt & Sons Limited, Wolverhampton: amenities for enginemen at Saltley Motive Power Depot, Birmingham

Seddon (Stoke), Limited, Stoke-on-Trent: lump sum contract, labour only, cleaning and painting platforms 12-17 Victoria Passenger Station, Manchester

A. J. Binns Limited, London, N.1: 1957 fencing programme, Derby South district

Durafencing (Northern) Limited, Manchester; 1957 fencing programme, Blackburn and Manchester districts

J. B. Corrie & Co., Ltd., London, S.W.7: 1957 fencing programme, Northampton district.

British Railways, North Eastern Region, have placed the following contracts:—

Paterson Hughes Engineering Co. Ltd., London: one 10-ton overhead gantry crane, Diesel Rail Welding Depot

R. & G. Brown (Amble) Limited, Amble: seven cottages; provision of scullery, and bathroom, Alnwick

Ormerod Shapers Limited, Hebden Bridge: one shaping machine, Thornaby Motive Power Depot.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from the West of India Portuguese Guaranteed, for two diesel locomotives, or alternatively three, and one spare engine. The locomotives should comply to the following principal characteristics: maximum weight per axle, 10 tons; maximum width, 8 ft. 6 in.; maximum height, 11 ft. 2½ in.; maximum load, 600 tons at 9 m.p.h. in shunting operations, and at 19 m.p.h. on main line work. The gauge of the Mormugao port railway is 1 m. and the minimum radius of curves is 109·12 m. (358 ft.).

The issuing authority is the Directorate General of Overseas Developments. Bids should be sent to the Directorate General, 13, Praça do Principe Real, Lisboa, or Inspection Services of the Mormugão Port and Railways, Goa, Portuguese India. The closing date is May 15, 1957. The reference ESB/6219/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from Australia for the design, manufacture, supply and delivery of four-wheel, cast steel frame, passenger car type bogie, common to underframes of 59 ft. (Ayl class cars), 62 ft. (standard and AH class cars) and 62 ft. 6 in. (ADG, ADH & AD^{V} class railcars) over headstocks.

The issuing authority is the Western Australia Government Tender Board. Bids should be sent to the office of the Western Australia Government Tender Board, 74, Murray Street, Perth. The closing date is April 25, 1957. A copy of the tender documents is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). The documents may also be inspected at the London Office of the Agent General for Western Australia. The reference ESB/7261/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from South Africa for 500,000 or 400,000 or 300,000 or 200,000 or 100,000 cast iron chairs, 80 lb., E.259 to drawing type E.259/9 and in accordance with specn. CCE. 1/2-1953 (revised March, 1953), and 125,000 cast steel chairs, 60 lb., E.129, to drawing type E.129/1 and in accordance with specn. CCE. 1/2-1953 (revised March, 1953).

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. A.6469: Cast Iron Chairs," should be addressed to the Chief Stores Superintendent, P.O. Box 7784, Johannesburg. The closing date is April 12, 1957. A copy of the tender documents, including specifications but not drawings, is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch for 10s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference ESB/6551/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for vacuum brake equipment as follows:—

40,000 ± 25 per cent dummy couplings 2 in. (malleable cast iron grade II or steel class I)

The issuing authority is the Director General of Supplies and Disposals. The tender No. is SRIA/RC/4208/11. Bids should be sent to the Director General of Supplies and Disposals, Shahjahan Road, New Delhi. The closing date is April 19, 1957. A set of tender documents is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch for 16s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference ESB/7951/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for chairs for use on permanent way as follows:—

300 chairs, check, mild steel, to item "Y" of drawing No. B.1588-32 (I.S.D. No. 9554) and to I.R.S. specification N.T.10/56

The issuing authority is the Director General of Supplies and Disposals. The tender No. is SR2/18329-G/II. Bids should be sent to the Director General of Supplies and Disposals, Shahjahan Road, New Delhi. The closing date is April 16, 1957. A set of tender documents is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1) Local representation is essential. The reference ESB/7306/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from Pakistan for signalling equipment, as follows:—

300 clips, inside, for angle iron lock bars, clamp type, FB(R) rails 60 lb.

472 cwt. steel wire, galvd., solid drawn No. 10 s.w.g.

The issuing authority is the Department of Supply and Development, Government of Pakistan. The tender No. is DS/H/4321/P-4. Bids should be send to the Director General of Supply and Development, Chittagong. The closing date is April 17, 1957. A copy of the tender documents is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch for 7s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. Local representation is essential. This Branch will, on request, supply a list of the local concerns who have expressed their willingness to act on behalf of United Kingdom firms. The refer-

ence ESB/7227/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from South Africa for steel sections and plates, as follows:—

40 steel sections and plates, including mild steel flats, strip, flat bars, rounds, squares, channels, and tyre retaining rings

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. H. 6515: Steel Sections and Plates" should be addressed to The Chairman of the Tender Board, South African Railways, P.O. Box 7784, Johannesburg. The closing date is April 26, 1957. A copy of the tender documents is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch for 10s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference ESB/7565/57 should be quoted in any correspondence with the Branch.

Notes and News

Middlesex County Council. — Heating engineering assistants are required in the County Architect's Department of Middlesex County Council. See Official Notices on page 408.

Project Engineer Required. — A long-established and progressive group of companies in the South of England offer a senior and expanding opportunity for an experienced engineer. See Official Notices on page 408.

Commercial Traction Engineer Required.— The General Electric Company has vacancy in its London office traction department for an experienced commercial traction engineer to deal with diesel-electric and electric locomotives and motor coach enquiries and contracts. See Official Notices on page 408.

New Tugs for Hartlepool Docks.—The British Transport Commission has approved provision of four new twin-screw diesel tugs for service at Hartlepool Docks. The new craft which will replace existing steam tugs, will be approximately 100 ft. in overall length, 25 ft. in beam, and 11 ft. in moulded depth, and will each be fitted with engines of 1,000 b.h.p.

Sudan Railways Purchasing Representative.—The Board of Trade has been informed by the British Embassy in Khartoum that Sudan Railways have decided to have their own representative in the Sudanese Purchasing Office in London. The official selected has been with the Railways for 30 years and should now be on his way to this country. The Sudan Purchasing Office in London is at the Sudan Embassy in London, Cleveland Row, St. James's, London, S.W.1. Telephone: Trafalgar 8080.

Notting Hill Gate Station Reconstruction.—Because of reconstruction work at Notting Hill Gate, the main entrance to the London Transport Circle Line station was closed on March 31, and a temporary entrance and exits brought into use the same day. The present Circle Line station building is to be demolished as part of the scheme to widen Notting Hill Gate, and construct a combined sub-surface station to serve both the Circle and Central Lines. The temporary entrance and exits, together with a temporary booking hall and ticket office, will be in use for a period of from 12 to 15 months pending completion of the new sub-surface booking hall.

Royal Journey on R.H.D.R.—The Queen and the Duke of Edinburgh with the Duke of Cornwall and Princess Anne travelled on March 30 in a six-coach special train of the Romney, Hythe, and Dymchurch Railway, from New Romney to Hythe. The Duke of Edinburgh acted as fireman for about three-quarters of the journey.

Railway Benevolent Institution.—At a meeting on March 19 the Board of the Railway Benevolent Institution granted annuities to six widows and three members involving an additional liability of £198 13s. per annum. Thirty-nine gratuities were also granted amounting to £397 10s. to meet cases of immediate necessity. Grants made from the Casualty Fund during the month of February amounted to £1,324 13s. A legacy of £100 has been received from the estate of the late Mr. H. W. Burnett "as a mark of appreciation for the kindness shown to him by the railwaymen over many years."

Kingswear/Dartmouth Ferry Service.—Two new ferry boats, the *Adrian Gilbert* and the *Humphrey Gilbert*, connecting Kingswear and Dartmouth, were placed into service on March 18 by the Western Region of British Railways. Built at the Bideford Yard of M. W. Blackmore & Sons Limited, each vessel has a single screw and is fitted with a 6DLM type Dorman diesel engine of 100 h.p., giving a speed of 10 knots. There is carrying capacity on each boat for 150 passengers, for whom ample cabin space has been provided. The service between Kingswear and Dartmouth will normally be worked by one ferry, the other being reserved as a relief. Immediately before the boats were brought into regular service, an inaugural ceremony took place on the pontoon at Dartmouth, at which Mr. R. F. Hanks, Chairman, Western Area Board, British Transport Commission, presided, supported by Mr. K. W. C. Grand, General Manager, Western Region, British Railways and Chief Officers of the Western and Southern Regions.

British Firms Discuss Polish Electrification.—Representatives of British electrical manufacturers are reported to have discussed, in Warsaw last month, with the Polish Ministry of Railways and the Ministry of Foreign Trade, the proposed electrification of the Tarnowskie Góry-Gdynia line.

Prevention of Corrosion.—A non-oxidising preservative, Camrex N.O.P., developed by Camrex Paints Limited, Camrex House, Sunderland, is claimed to be particularly suitable for prevention of corrosion to railway rolling stock, besides steelwork. For the interior of tender tanks grade No. 5 is said to give excellent service, while grade No. 17 is recommended for the underside of the tanks. For the prevention of corrosion behind carriage panels, and behind the insulation of refrigerator cars, grade No. 17 is suitable. The material is stated to be unaffected by most acids or alkalis, chemical fumes, and moisture. It is not a bituminous preparation, never oxidises, but remains permanently flexible.

B.I.M. Scottish Management Conference.—"Top management planning and control" is the theme of the British Institute of Management conference to be held at Gleneagles on May 3-5. The chairman of the plenary session in the afternoon of May 3 will be Mr. Harold Wilmot, Chairman & Managing Director of Beyer

Inaugurating the "Humphrey Gilbert": (left to right) The Mayor of Dartmouth; Mr. Grand; Mr. Hanks; the Town Clerk of Dartmouth; and the Chairman of Kingswear Parish Council

Peacock & Co. Ltd. and Chairman of the B.I.M. Council, and the speaker, Mr. H. P. Barker, Chairman of Parkinson & Cowan Limited, part-time Member of the B.T.C., and Member of the B.I.M. Council. Sectional meetings will include that in the evening of May 3, at which Mr. W. D. Lorimer, Managing Director of the North British Locomotive Co. Ltd., will preside, and Mr. P. K. Digby, of the Production Engineering Research Association of Great Britain, will speak on "Production planning and control: its use by top management." Further information may be obtained from the British Institute of Management, 8, Hill Street, London, W.1, or from the Manager for Scotland, B.I.M. Scottish Office, 141, St. Vincent Street, Glasgow, C.2.

Vulcan Foundry Limited.—The group profits of the Vulcan Foundry Limited, controlled by English Electric Co. Ltd., for the year ended December 29, 1956, fell sharply to £139,469 from £628,502 for 1955, after depreciation of £62,689 (£54,350), but before tax of £64,662 (£294,397). The ordinary dividend is 10 per cent (same).

B.E.A. Revenue Increased.—Provisional results of British European Airways for 1956 indicate that the total revenue rose to £23,420,000, an improvement of £2,574,000, or 12·3 per cent, compared with 1955. Traffic increased by 15·7 per cent to 87,900,000 load ton miles, and the number of passengers carried increased from 2,157,000 to 2,436,000. Freight rose by 26·8 per cent to 8,830,000 freight ton miles, and now accounts for 10 per cent of the corporation's total traffic.

Western Region Rail Travel Advisers Introduced.—The first Rail Travel Adviser in Britain, a post created by the Western Region of British Railways to help travellers at certain large stations on the Region, took up her duty at Birmingham Snow Hill station on March 28. Her job will be to mix with the passengers on the station, giving advice and assistance to those who have travel problems. A twelve-week course of study included an intensive study of Western Region timetables, cross-country services and principal changing points, as well as seat reservation arrangements, refreshment and sleeping car services. The course also included how to give advice on the sending of passengers' luggage in advance and on the recovery of lost property. Two other young women are now being trained as Rail Travel Advisers and will eventually be located at Paddington and Cardiff. The originator of the scheme was Mr. K. W. C. Grand, General Manager of the Western Region, and the girls are trained in turn by Miss Cecily Davenport, Chief Supervisor & Instructor in the Central Enquiry Bureau of the Chief Commercial Manager's Office. Miss Davenport has been training enquiry clerks at Paddington since 1959, and from that time over 200 girls have passed through her hands.

The Western Region rail travel adviser answering a train query

D. Napier & Son Limited Dividend.—The profit of D. Napier & Son Limited for 1956, after all charges other than tax and before transferring to capital reserve tax relief on investment allowance on capital expenditure, was £247,866 compared with £414,131 in the previous year. Depreciation charged was £431,396 (£345,236). Taxation took £113,000 (£170,000), capital reserve £50,000 (£60,000), general reserve nil (£100,000). The recommended ordinary dividend is 10 per cent (same).

Compoflex Co. Ltd. New Manufacturing Group.—The Compoflex Co. Ltd. has extended its flexibles advisory and manufacturing facilities to include certain forms of rigid tubing by the acquisition of the entire share capitals of Rollo Hardy & Co. Ltd. and Tube Making Machines Limited. Both companies will continue their activities and will operate as independent manufacturing organisations at Blaenrhondda, Glamorgan. The two sales organisations, however, have been absorbed into the parent company's new rigid tube division, although the technical services remain at Blaenrhondda. The export departments have been integrated with the Compoflex Export Division.

G.N.R.(I.) Seeks Rate Increase.—The Northern Ireland Transport Tribunal is expected to meet shortly to hear an application by the Great Northern Railway Board for an increase of 10 per cent. in the maximum charges for passenger and freight services. Last December, the Ulster Transport Authority was granted permission to increase its charges by 15 per cent after the rise in the cost of fuel, but, in actual fact, its charges were raised by only 10 per cent. The G.N.R. Board, while not so severely affected by the rise in the price of petrol, has had to face other rising costs. The last revision of its fares took place at the five-yearly review last July, when there was some upward adjustment of season ticket rates and decreases in ordinary fares.

New Signal Gantry at St. Pancras.—In connection with the installation of power signalling at St. Pancras, London Midland Region, planned to be brought into service in the autumn, a new all-welded lattice steel signal gantry, constructed by Simmons & Hawker Limited, of Feltham, Middlesex, was placed in position during last Sunday, with a minimum of interruption to train services. It is 76 ft. long, spans five running lines and a siding, and is the second largest in the Region, there being one at Windsor Bridge, Manchester, with 1 ft. extra span. In due course it will carry three four-aspect colour-light signals, each with position-light subsidiary below, and replace the present two wooden bracket signals carrying ten semaphore arms. The structure was put in place by mobile diesel cranes on its two 25-ft. uprights, which had to be positioned accurately over the appropriate supporting piers of the series of arches which carry the station and tracks for some distance out, having regard to the requirements of the signalling layout.

West of England Car Tourist Service Poster.—The new poster shown below was produced by the department of the Public Relations & Publicity Officer, Western

Western Region poster featuring the car tourist service between Paddington and St. Austell

Region. The artist was John S. Smith. The poster was printed by Roberts (Posters) Limited, of Gloucester, and 600 copies, in three colours, are being used in the 1957 summer season display throughout British Railways.

Brush Group Increased Costs.—Profits of the Brush Group Limited fell from £2,339,959 in 1955 to £1,878,104 last year. No dividend is recommended on the ordinary stock, which paid 10 per cent for 1955. The directors state that during the year deliveries fell short of expectations, and costs, including wages, salaries, and materials, increased sharply. There was a heavy increase in bank charges. The group received during 1956 more orders than in 1955, and the order book is better balanced than for many months past, but it is too early to forecast 1957 results. Sales of products were almost £400,000 higher at £22,488,981, but the cost of the goods sold rose by over £850,000 to £20,610,877. The net profit fell from £479,836 to £174,101.

Gloucester Railway Team Wins Road Safety Trophy.—Motor drivers representing the Gloucester Commercial District of the Western Region were present at Paddington Station on March 25, when the Company of Veteran Motorists' Trophy, awarded annually in the Safety on the Roads Competition organised by British Railways, was presented to Mr. M. G. Cooper, District Commercial Manager, Gloucester. The presentation was made by Mr. R. F. Hanks, Chairman,

Western Area Board, British Transport Commission, who was accompanied by Mr. K. W. C. Grand, General Manager, Mr. A. C. B. Pickford, Chief Commercial Manager, Mr. C. J. Rider, Public Relations & Publicity Officer, Mr. G. S. Halliday, Road Motor Engineer, and Mr. A. E. Flaxman, Assistant to the Chief Commercial Manager. This competition was introduced last year after the presentation of silver cups by the Company of Veteran Motorists to the B.T.C., to be competed for annually by British Railways goods and parcels motor drivers in each Region.

Wagon Finance Distribution.—A jubilee distribution of 12½ per cent not subject to tax is to be paid by Wagon Finance Corporation Limited out of capital reserves. The dividend for 1956 is held at 37½ per cent, with an unchanged final payment of 28¼ per cent. Group net profits, after tax, were £167,846 against £165,487 for 1955. General reserve receives £125,000 (£75,000).

Forthcoming Meetings

Open currently and until further notice.—**British Transport Commission: Historical Exhibition "Transport Treasures" in Shareholders' Meeting Room, Euston Station, from 10 a.m. to 6 p.m. on weekdays, and 2 to 6 p.m. on Sundays. Admission 6d.**

April 15 (*Mon.*).—Railway Correspondence & Travel Society, Merseyside Branch, at the Woodside Hotel, Birkenhead, at 7.30 p.m. Talk on "Canal railway system," by Mr. W. Heywood, Railway Superintendent, Manchester Ship Canal.

April 15 (*Mon.*).—Railway Correspondence & Travel Society, West Midlands Branch, at 64, Holyhead Road, Coventry, at 7.30 p.m. Talk on "Ireland today," by Mr. D. Luscome.

April 15 (*Mon.*).—Permanent Way Institution, London Section, at the headquarters of the British Transport Commission, 222, Marylebone Road, London, N.W.1, at 5.45 p.m. Paper (illustrated) on "Effect of new forms of motive power on the permanent way—the Mechanical Engineer's point of view," by Mr. E. S. Cox, President-Elect.

April 15 (*Mon.*).—Stephenson Locomotive Society, Midland Area, at the Birmingham Exchange & Engineering Centre, at 7.15 p.m. Railway ciné film shots around the British Isles and Cologne, by Mr. W. A. Camwell. Repeated similarly on April 17.

April 16 (*Tue.*).—Railway Correspondence and Travel Society, Northampton Branch, at the Liberal Club, Castillian Street, Northampton, at 7.30 p.m. Mr. W. A. Camwell's cine film shots of British scenes, and scenes in the Cologne area, 1956.

April 16 (*Tue.*).—Institute of Transport, Metropolitan Graduate & Student Society, at 80, Portland Place, London, W.1., at 5.45 for 6.15 p.m. "Transport Forum."

April 18 (*Thu.*).—Diesel Engineers and Users Association. Annual luncheon at the Connaught Rooms, London, W.C.2.

April 25 (*Thu.*).—Railway Correspondence & Travel Society, Sheffield Branch, at the Y.M.C.A., Fargate, Sheffield, at 7.15 p.m. Paper on "Railway rambles in the S.E. Midlands," by Mr. T. Routhwaite.

Railway Stock Market

The labour and political news, and a further easing of the £ in relation to the U.S.A. dollar, had an unsettling influence on stock markets. British Funds and industrial shares moved lower, although the City has remained hopeful that the Budget will bring incentives for industry in the shape of tax concessions. There was, however, less talk of fresh reduction in the bank rate.

Dollar stocks, too, moved lower after earlier gains. Canadian Pacifics at $65⅞ lost part of their rise, but were $1 above the price ruling a week ago. The company's 4 per cent preference stock eased from £60¼ to £58¾, but the 4 per cent debentures have been maintained at £70¼. White Pass shares remained more active and kept at $22¼. Nyasaland Railways shares were again 12s. 9d.

In foreign rails, Antofagasta moved up from 30½ a week ago to £32, buyers being attracted by the good yield, but the preference stock came back from 46½ to 45. San Paulo Railway 3s. units have changed hands around, and Mexican Central "A" bearer debentures were 70. United of Havana second income stock was 8¼ with the consolidated stock 2¼. Chilean Northern debentures transferred around 44½, Costa Rica stock was 24½, Paraguay Central 6 per cent debentures 17½ and Guayaquil & Quito assented bonds 75. International of Central America shares were quoted at $37½. Taltal shares kept at 11s. 6d.

Engineering shares have moved lower, but selling has not been nearly as heavy as might have been expected, bearing in mind the strike developments which must affect earnings of a large number of companies.

Beyer Peacock at 43s. 6d. were quite well maintained as compared with a week ago, and helped by the rise in trading profits from £73,698 to £102,258 and the unchanged 10 per cent dividend, Birmingham Wagon shares have strengthened from 20s. 4½d. to 20s. 10½d., Charles Roberts 5s. shares have kept at 11s. 6d. while Gloucester Wagon 10s. shares firmed up from 13s. 9d. to 14s. Wagon Repairs 5s. shares held at 13s. 6d., North British Locomotive eased from 12s. 6d. to 12s. 3d., and Hurst Nelson were again 36s. 6d. G. D. Peters kept at 30s.

On the other hand, more active shares reflected the easier trend in markets earlier in the week. Vickers receded from 44s. 9d. to 43s. 9d., Cammell Laird 5s. shares from 12s. to 11s. 9d. and Pressed Steel 5s. shares eased slightly to 13s. 10½d. Associated Electrical dropped back from 63s. 9d. to 62s., General Electric from 56s. 6d. to 54s. 6d. and English Electric were 57s. compared with 58s. 3d. a week ago.

The 5s. shares of the Brush Group developed activity on market talk of a possible take-over offer from the Hawker Group which was not confirmed: but the shares rallied from 5s. 3d. to 5s. 10½d. British Insulated Cables strengthened from 50s. 5d. to 51s. while Westinghouse on the coming rights offer were 81s. 9d. compared with 81s. 3d. a week ago. Crompton Parkinson 5s. shares have been firm at 16s. 1½d. but Clarke Chapman at 154s. 4½d. lost part of their recent big advance which followed the financial results. T. W. Ward showed firmness at 70s. 3d., Renold Chain were 37s. and Ruston & Hornsby strengthened to 32s. 9d. Edgar Allen shares moved higher at 32s., Tube Investments were 63s. 9d. and George Cohen 5s. 10s. 1½d. Johnson & Phillips were dealt in around 29s. 6d. and F. Perkins 10s. shares strengthened to 18s. 4½d. Helped by the higher dividend and profits, British Rollmakers rose 1s. 3d. to 43s.